FLORA
of
SOUTHERN CALIFORNIA

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FLORA
OF
SOUTHERN CALIFORNIA

BY

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AND

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INTRODUCTION

Since the publication of the Botany of California by the Geographical survey in 1876 many new species have been added to the Flora of Southern California and in this work an attempt has been made to collect all those additions and condense their descriptions so as to form a convenient volume for the field worker.

Southern California embraces the counties of Santa Barbara, San Bernardino, Riverside, Imperial, San Diego, Orange and Los Angeles. This region separated by the mountains on the north and the desert on the east has a distinctive flora which renders a separate consideration desirable.

For the state of California two admirable floras are in process of publication now, viz., The "Flora of California," by Prof. W. L. Jepson and the "Flora of the Pacific States," by Prof. LeRoy Abrams. Parts of both covering about one-third of the subject have already been issued and students desiring illustrations and fuller details of description can obtain them there. In the "North American Flora," at present being issued in parts by the New York Botanical Gardens, the various genera are described by specialists, so this work is likely to remain a standard one for years to come. For the localities named the authors are responsible. When the localities are borrowed from other authors or have been seen in other herbaria, the names of the finders are given. When the locality is followed by a date it indicates that that particular plant is an introduction, and the location and year is the time and place of its first appearance.

To Dr. H. M. Hall for the liberty to use his "Compositæ of S. California" as a working basis for that order; to Dr. J. N. Rose and P. C. Standley and S. B. Parish for the identification of many doubtful species our grateful thanks are due.

The Authors

SYSTEMATIC TREATMENT OF THE VASCULAR PLANTS.

SYNOPSIS OF THE LARGER GROUPS, WITH KEYS.

Subkingdom PTERIDOPHYTA.

Plants without flowers or seeds, producing spores, each of which, on germination, develops into a flat or irregular prothallium. The prothallia bear the reproductive organs (antheridia and archegonia). As a result of the fertilization of an egg in the archegonium by a sperm produced in the antheridia a fern or an allied plant is developed.

Key to the Orders.

Leaves broad, entire or dissected; ferns or fernlike plants.
  Spores of 1 kind, borne in sporangia; plants not aquatic .... Filicales.

  Spores of 2 kinds, borne in sporocarps; aquatics... Salviniales.
Leaves narrow, scalelike or awllike; mosslike or rushlike plants.

  Sporangia in a terminal cone; stems hollow...... Equisetales.
  Sporangia in the axils of small or leaflike bracts;

  stems solid .... Lycopodiales.

Subkingdom SPERMATOPHYTA.

Plants with flowers which produce seeds. Microspores (pollen grains) borne in the microsporangia (anther sac) develop each into a tubular prothallium; a macrospore (embryo sac) develops a minute prothallium and, together with the macrosporangium (ovule) in which it is contained, ripens into a seed.

Key to the Classes.

Ovules and seeds borne on the face of a bract or scale; stigmas wanting................ Gymnospermae.

Ovules and seeds borne in a closed cavity; stigmas present .... Angiospermae.

Class 1. GYMNOSPERMAE.

Key to the Orders.

Staminate and pistillate flowers both in aments; perianth none; trees or shrubs with needle-like or scalelike leaves..........Pinales.

Staminate flowers in aments; pistillate flowers single or in pairs; perianth present; shrubs with jointed stems, the leaves reduced to sheathing scales ....Gnetales.

Class 2. ANGIOSPERMAE.

Key to the Subclasses.

Cotyledon 1; stems endogenous; leaves parallel-veined ....Monocotyledones.

Cotyledons normally 2; stems exogenous; leaves not parallel-veined, or rarely apparently so. Dicotyledones.

Subclass 1. MONOCOTYLEDONES.

Key to the Orders.

Perianth when present rudimentary or degenerate, often composed of bristles or mere scales, not corolla-like, sometimes wanting.

Flowers in the axils of dry or chaffy, usually imbricated, bracts (scales or glumes)......Poales.

Flowers not in the axils of dry or chaffy bracts.

Perianth of bristles or chaffy scales............Pandanales.

Perianth fleshy or herbaceous, or wanting.

Fruit baccate; endosperm present; plants 1 cm. broad or less, consisting merely of a flat thallus with 1 or more roots, floating....Arales.

Fruit drupaceous; endosperm wanting; aquatics with well-developed stems.............Naiadales.

Perianth of 2 distinct series, the inner usually corolla-like.

Gynœcium of distinct carpels...................Alismales.

Gynœcium of united carpels.

Endosperm mealy ....Xyridales.

Endosperm fleshy, horny or cartilaginous.

Ovary and fruit superior...................Liliales.

Ovary and fruit wholly or half inferior.

Endosperm present; flowers regular........Amaryllidales.

Endosperm wanting; flowers irregular......Orchidales.

Subclass 2. DICOTYLEDONES.

Key to the Orders.

- Corolla wanting.
  - Calyx wanting.
    - Herbs.
      - Flowers monœcious or diœcious.............. Euphorbiales.
      - Flowers mainly perfect.
        - Flowers spicate; styles wanting............ Piperales.
        - Flowers axillary; styles present. (Callitrichaceae) .... Euphorbiales.
    - Trees or shrubs.
      - Fruit many-seeded; seeds each with a tuft of hairs .... Salicales.
      - Fruit 1-seeded; seeds without tufts of hairs... Oleales.
  - Calyx present, at least in the staminate or in the perfect flowers.
    - Flowers, at least the staminate, in aments or ament-like spikes; fruit a nut or achene; trees or shrubs.
      - Leaves simple; ovule pendulous and anatropous. Fagales.
      - Leaves pinnate; ovule erect and orthotropous. Juglandales.
    - Flowers, at least the staminate, not in aments; fruit various; herbs, trees, or shrubs.
      - Ovary inferior.
        - Flowers, at least the staminate, in involucrate heads. (Ambrosiaceae).......... Asterales.
        - Flowers not in involucrate heads.
          - Fruit either a berry or a drupe or nutlike.
            - Stamens as many as the perianth segments and alternate with them or else fewer. (Tetragoniaceae)...... Chenopodiales.
            - Stamens as many as the perianth segments and opposite them or else twice as many......(Families of) Myrtales.
          - Fruit a capsule.
            - Sepals as many as the cells of the ovary or half as many.................. Myrtales.
            - Sepals (4 or 5) at least twice as many as the cells of the ovary. .... (Saxifragaceae) Rosales.
      - Ovary superior.
        - Gynœcium of 1 carpel or several distinct carpels; stigma and styles of each solitary.
          - Carpels several.
            - Stamens inserted below the ovary. .... (Families of) Ranales.
            - Stamens inserted on the edge of a cup-shaped hypanthium....(Families of) Rosales.

Carpels solitary.
  Style lateral and oblique.
      .... (Phytolaccaceae) CHENOPODIALES.

  Style axil, erect.
    Ovary neither inclosed nor seated in a hypanthium or a calyx tube.
      Flowers solitary in the axils of the leaves; aquatics.
          .... (Ceratophyllaceae) RANALES.

      Flowers not solitary in the axils of the leaves; terrestrial plants.
          .... (Urticaceae) URTICALES.

    Ovary inclosed in or seated in a hypanthium or a calyx tube.
      Stamens borne under the gynœcium.
          .... (Allioniaceae) CHENOPODIALES.

      Stamens borne on the hypanthium or adnate to the calyx tube.... THYMELAEALES.

Gynœcium of 2 or several united carpels; stigmas or styles 2 to several.
  Ovary, by abortion, 1-celled and 1-ovuled.
    Leaves with sheathing stipules......... POLYGONALES.

    Leaves exstipulate, or the stipules, if present, not sheathing.............
      Trees or shrubs ....(Ulmaceae) URTICALES.

      Herbs or vines.
        Stipules herbaceous; inflorescence spicate or racemose; leaf blades palmately veined.
            (Cannabinaceae) URTICALES.

        Stipules scarious or hyaline or none; inflorescence cymose; leaf blades pinnately veined. (Families of) CHENOPODIALES.

  Ovary several-celled, or with several placentæ, several-ovuled.
    Stamens perigynous or epigynous, inserted on the margin of a hypanthium or a disk.
      Fruit a samara........(Aceraceae) SAPINDALES.

      Fruit not a samara.
        Fruit drupelike or berry-like; trees or shrubs............... RHAMNALES.

        Fruit a capsule; herbs........... ARISTOLOCHIALES.

    Stamens hypogynous, inserted under the gynœcium in the perfect flowers, not on a disk in the pistillate flowers.
      Flowers monœcious or diœcious.
          (Euphorbiaceae) EUPHORBIALES.

Flowers perfect.
Stamens tetradynamous. (Brassicaceae) PAPAVERALES.
Stamens not tetradynamous...... CHENOPODIALES.

Corolla present.
Petals more or less united.
Ovary inferior.
Stamens with their filaments free from the corolla.
Stamens 10; anther sacs opening by terminal pores or chinks.........(Vacciniaceae) ERICALES.
Stamens 5 or fewer: anther sacs opening by longitudinal slits .... CAMPANULALES.
Stamens adnate to the corolla.
Ovary with 1 fertile cavity.
Flowers in involucrate heads........... ASTERALES.
Flowers not in involucrate heads......... VALERIANALES.
Ovary with 2 to many fertile cavities.
Plants tendril-bearing.... (Cucurbitaceae) CAMPANULALES.
Plants not tendril-bearing.
Ovules mostly on basal placentæ; plants parasitic .... SANTALALES.
Ovules not on basal placentæ; plants not parasitic .... RUBIALES.

Ovary superior.
Stamens free from the corolla.
Gynœcium of a singel carpel..(Families of) ROSALES.
Gynœcium of several united carpels.
Filaments distinct..........(Families of) ERICALES.
Filaments united.
Stamens diadelphous ....(Fumariaceae) PAPAVERALES.
Stamens monadelphous.
Anther sacs opening by slits. (Oxalidaceae) GERANIALES.
Anther sacs opening by pores.
Calyx and corolla very irregular... POLYGALALES.
Calyx and corolla regular. (Families of) ERICALES.
Stamens partially adnate to the corolla.
Stamens as many as the lobes of the corolla and opposite them, or twice as many or more.
Ovary 1-celled.
Placentæ central or basal............. PRIMULALES.
Placentæ parietal .....(Fouquieriaceae) HYPERICALES.
Ovary several-celled.
Upper portion of ovaries distinct. (Crassulaceae) ROSALES.
Upper portion of ovaries united........ EBENALES.

Stamens as many as the lobes of the corolla and alternate with them or fewer.
Corolla scarious, veinless; fruit a pyxis.. Plantaginales.
Corolla not scarious, veiny; fruit not a pyxis.
Carpels distinct, except sometimes at the apex.
Style terminal .... Asclepiadales.
Style basal ....(Dichondraceae) Polemoniales.
Carpels united.
Ovary 1-celled, with central placentæ. Gentianales.
Ovary 2 or 3-celled or falsely 4-celled, or if 1-celled with parietal placentæ. Polemoniales.

Petals distinct, at least at the base.
Carpels solitary, or several and distinct, or united only at the base.
Stamens on the margin of a hypanthium (this very small in some Saxifragaceae)...... Rosales.
Stamens at the base of the receptacle, hypogynous.
Flowers in monœcious heads..(Platanaceae) Rosales.
Flowers not in monœcious heads.
Plants with firm stems and leaves, not succulent .... Ranales.
Plants with succulent stems and leaves. (Crassulaceae) Rosales.
Carpels several and united.
Ovary inferior.
Stamens numerous.
Hypanthium produced beyond the ovary. (Families of) Myrtales.
Hypanthium not produced beyond the ovary.
Ovary partly inferior..(Hydrangeaceae) Rosales.
Ovary wholly inferior................. Opuntiales.
Stamens not more than twice as many as the petals.
Styles wanting. (Stigmas sessile; aquatics ....(Gunneraceae) Myrtales.
Styles present.
Styles distinct.
Ovules solitary in each cell; fruit a drupe or of 2 to 5 more or less united achenes .... Umbellales.
Ovules several in each cell; fruit a capsule or a fleshy, many-seeded, berry.
Fruit, if dehiscent, valvate. (Families of) Rosales
Fruit circumscissile .(Portulacaceae) Chenopodiales.

- Styles united or single.
  - Plants with tendrils; fruit a pepo. (Cucurbitaceae) CAMPANULALES.
  - Plants without tendrils; fruit not a pepo.
    - Ovary exceeding the hypanthium, the top free ......(Hydrangeaceae) ROSALES.
    - Ovary inclosed in or surpassed by the hypanthium or adnate to it.
      - Ovules solitary in each cell......UMBELLALES
      - Ovules several in each cell.
        - Ovary with parietal placentae. (Loasaceae) OPUNTIALES.
        - Ovary with central or basal Placentæ ....(Families of) MYRTALES.
- Ovary superior.
  - Stamens inserted on the margin of a disk or hypanthium (perigynous or hypogynous).
    - Stamens as many as the petals and opposite them.
      - Styles and upper part of the ovaries distinct; ovules and seeds many. (Saxifragaceae) ROSALES.
      - Styles united; ovules and seeds solitary or 2 ....RHAMNALES.
    - Stamens as many as the petals and alternate with them or more.
      - Styles distinct ....(Saxifragaceae) ROSALES.
      - Styles united.
        - Hypanthium cup-shaped or campanulate; disk obsolete or inconspicuous......MYRTALES.
        - Hypanthium flat or obsolete; disk fleshy.
          - Plants with secreting glands in the bark ....(Rutaceae) GERANIALES.
          - Plants without secreting glands in the bark ....SAPINDALES.
  - Stamens inserted at the base of the ovary or receptacle.
    - Stamens numerous.
      - Sepals valvate; filaments united..........MALVALES.
      - Sepals imbricated; filaments various......PAPAVERALES.
    - Stamens few, not over twice as many as the petals.
      - Stamens as many as the petals and opposite them.
        - Anther sacs opening by hinged valves. (Berberidaceae) RANALES.
        - Anther sacs opening by slits.
          - Flowers monœcious .................EUPHORBIALES.
          - Flowers perfect.
            - Ovules and seeds several or many; embryo coiled...(Portulacaceae) CHENOPODIALES.

- Ovules and seeds solitary; embryo straight ...... (Plumbaginaceae) PRIMULALES.
- Stamens as many as the petals and alternate with them or more, sometimes twice as many.
  - Stamens 6; petals 4; sepals 2 or 4. (Families of) PAPAVERALES.
  - Stamens, petals, and sepals of the same number, or stamens more than the sepals or petals, then usually twice as many.
    - Ovary 1-celled.
      - Ovules and seeds on basal or central placentæ .... (Families of) CHENOPODIALES.
      - Ovules and seeds on parietal placentæ.
        - Stamens with united filaments (no staminodia) .... MALVALES.
        - Stamens with distinct filaments.
          - Staminodia present. (Parnassiaceae) ROSALES.
          - Staminodia wanting. (Families of) HYPERICALES.
    - Ovary several-celled.
      - Stamens adnate to the gynœcium. (Asclepiadaceae) ASCLEPIADALES.
      - Stamens not adnate to the gynœcium.
        - Filaments wholly or partly united.
          - Anthers opening by long slits. (Families of) GERANIALES.
          - Anthers opening by pores...... POLYGALALES.
        - Filaments distinct.
          - Anthers opening by pores. (Families of) ERICALES.
          - Anthers opening by slits.
            - Stigmas and styles distinct and cleft, or foliaceous, or united by pairs........... EUPHORBIALES.
            - Stigmas or styles all distinct or all united, neither cleft nor foliaceous.
            - Stamens 2 .... OLEALES.
              - Stamens more than 2.
                - Ovules 2 or more in each carpel .... HYPERICALES.
                - Ovules solitary in each carpel ... (Families of) GERANIALES.

PTERIDOPHYTA.

Key to the Families

Leaves usually broad, entire or dissected, not scale-like; fern-like plants.
  Spores of one kind, minute, borne in sporangia.
    Vernation not spirally coiled; sporangia ringless, leathery, opening by a transverse slit, arranged in spikes or panicles..... 1. Ophioglossaceae.
    Vernation spirally coiled; sporangia membranous, provided with a ring, which opens elastically .... 2. Polypodiaceae.
  Spores of two kinds, minute microspores (male) and larger macrospores (female), borne in sporocarps.
    Plant rooting in the mud; leaves 4-foliate, petioled. .... 3. Marsiliaceae.
    Plant minute, floating; leaves entire or 2-lobed.. 4. Salviniaceae.
Leaves scale-like or awl-like; moss-like or rush-like plants.
  Sporanges in an apical cone, borne under peltate bracts; stem usually hollow, rush-like... 5. Equisetaceae.
  Sporanges in the axils of small leaf-like bracts; stem solid.
    Leaves awl-like, elongate, borne on a short, thick, corm-like caudex; water plants......... 6. Isoetaceae.
    Leaves scale-like, flat, borne on a distinct stem; land plants. .... 7. Selaginellaceae.

1. OPHIOGLOSSACEAE.

Sterile blade simple, entire, with netted veins; sporangia united in 2 rows in a simple, slender, fleshy spike.................. 1. Ophioglossum.
Sterile blade 1-3 times pinnately divided, with free veins; sporangia globose, all distinct, borne in a 1-4-pinnate panicle.......... 2. Botrychium.

1. OPHIOGLOSSUM. Adder tongue.

Sporangia large, coriaceous, connate, coherent in two ranks on the edges of a simple spike; leaf simple, attached at the middle of the main stalk or below, entire; veins anastomosing; spores copious, sulphur-yellow.

1. **O. californicum** Prantl. High mesas near San Diego, the type locality; also found in northern Lower California.

2. BOTRYCHIUM. Grape-fern. Moonwort.

Rootstalk very short, erect, with clustered fleshy roots, the bud for next year's growth usually imbedded in the base of the stipe; sterile segment of frond pinnately or ternately divided or compound; fertile segment 1- to 3-pinnate, with double rows of sessile, naked sporangia.

1. **B. simplex** E. Hitchc. In a canyon of South Mountain, Mill Creek, *Robertson*; Big Meadows, *Hall*; San Antonio Mts., *Johnston.*

2. POLYPODIACEAE. Fern Family.

Plant body consisting of a creeping or erect stem (rootstock) bearing scattered or clustered leaves (fronds); sporangia borne on the back or margin of the frond in lines or rounded masses (sori), stalked, provided with a vertical elastic ring, opening transversely at maturity; sori either naked or covered when young with a membraneous indusium which is either a special outgrowth of the leaf or is formed from the more or less altered leaf margin; prothalia green, above ground.

Sori on the under surface of the fronds, each provided with a special indusium not connected with the margin of the frond.
Sori roundish.
Indusia inferior or attached at base at one side of sorus.
Indusia inferior, stellate or split into spreading lobes. .... 1. Woodsia.

Indusia attached at base at one side of the sorus, at first arched over it, finally thrown back or evanescent............ 2. Filix.

Indusia superior.
Indusia peltate. .... 3. Polystichum.

Indusia orbicular-reniform, attached at the sinus. .... 4. Thelypteris.

Sori oblong or linear, or shaped like a horseshoe or shepherd's crook.
Sori oblong, parallel to the midrib or rachis; veins reticulate. .... 5. Woodwardia.

Sori straight or rarely slightly curved, oblique to the rachis, single on the sides of the veins. .... 6. Asplenium.

Sori, at least in part, shaped like a horseshoe or shepherd's crook, crossing the fertile vein and more or less recurved upon it..... 7. Athyrium.

- Sori naked, or protected, at least at first, by the revolute or reflexed margins, or portions of the margins of the frond.
  - Margin of the frond flat or merely revolute, not modified.
    - Margin of the frond revolute; sori more or less confluent, forming a marginal band.....14. Notholaena.
    - Margin of the frond flat; sori dot-like on the veins.
      - Stipes articulated to the rhizome............13. Polypodium.
      - Stipes not articulated to the rhizome.......... 4. Thelypteris.
  - Margin of the frond reflexed over the sori, more or less modified.
    - Sori borne on the under side of the reflexed lobes of the frond.................... 8. Adiantum.
    - Sori not borne on the under side of the reflexed portions of the margin of the frond.
      - Sori borne on a continuous vein-like receptacle connecting the ends of the veinlets.
      - Sori borne on the veins at or near their tips. 9. Pteridium
        - Sori extending down the veins; edges of the fertile fronds finally opening out flat; sterile and fertile fronds markedly dissimilar. ....10. Cryptogramma.
        - Sori dorsal, following the veinlets..........15. Pityrogramma.
        - Sori marginal or submarginal; sterile and fertile fronds alike or somewhat dissimilar.
          - Sori confluent, forming a submarginal band; segments of the fronds glabrous or nearly so. ....11. Pellaea.
          - Sori distinct or contiguous; segments usually pubescent, tomentose or scaly......12. Cheilanthus.

1. WOODSIA.

Small plants with tufted, pinnately compound fronds; sori orbicular, borne on the back of simply forked, free veins; indusium inferior, thin, breaking at the top and splitting into several laciniate lobes.

1. **W. oregana** D. C. Eaton. Rare at high altitudes. Reported from the Canadian Zone of the San Bernardino Mts. by *Parish*. San Gabriel Mts., near Rock Creek.

2. FILIX.

Ferns with pinnately compound fronds of thin texture; sori roundish, each borne on the back of a vein; indusium membraneous, hoodlike, attached by a broad base on its inner side.

1. **F. fragilis** Gilib. Found in the mountainous districts on damp, shaded rocks, especially along the banks of streams. Little Santa Anita Canyon; San Bernardino Mts., *Parish.*

3. POLYSTICHUM.

Ferns of rather rigid habits; fronds firm in texture, pinnate to pinnately decompound, usually having spinulose or sharply toothed margins; sori round, borne on the back or rarely at the apex of the veins; indusium peltate; veins all free.

Fronds simply pinnate; pinnae horizontal, slightly falcate, strongly auricled on the upper side at base, serrations bristle-pointed; sori in a single row near the margin. 1. *P. munitum.*

Fronds more compound; pinnae usually with one pair of pinnules at the base; margin serrate with incurved teeth, the apex blunt-rounded; sori nearer the midrib than the margin. .... 2. *P. scopulinum.*

1. **P. munitum** Presl. Common on shaded canyon sides mostly above 900 m. alt.

2. **P. scopulinum** Maxon. Locally abundant in rock crevices at the Hudsonian island in Snow Canyon. San Bernardino Mts., *Parish,* divide between Little Rock and Bear Creek, Sierra Madre Mts., *Peirson.*

4. THELYPTERIS.

Ferns with stipes not articulated to the rhizomes, and pinnatifid to more compound forms; veins pinnate, free, the veinlets simple or forked; sori borne on the veins, roundish, ours all with indusia; indusia usually cordate-reniform and attached by the center or sinus; stipes and rachises scaly and frequently glandular.

Fronds thin-membranous, bipinnatifid; lower pinnae little smaller than those above; veins simple; indusia pubescent. .... 1. *T. Feei.*

Texture subcoriaceous; veins forking freely.

Fronds mostly bipinnate; indusia convex, without marginal glands. .... 2. *T. filix-mas.*

Fronds bipinnate or tripinnatifid; segments spinulose-toothed; indusia firm, convex, the margin bearing short-stalked glands. ... 3. *T. arguta.*

1. **T. Feei** Moxley. Collected several times near Santa Barbara, acc. to *Parish;* Roberts' Canyon and Monrovia Canyon, San Gabriel Mts., *Kessler;* Eaton Canyon.

2. **T. filix-mas** Nieuwl. Upper Holcomb Valley, San Bernardino Mts., *Parish.* The only record for the State. *Male Fern.*

3. **T. arguta** Moxley. Common throughout the chaparral belt on shaded and rocky slopes.

5. WOODWARDIA. Chain Fern.

Sori oblong or linear, sunk in cavities in the frond, arranged in a chain-like row parallel to the midribs of the pinnae and pinnules and near them; indusium sub-coriaceous, fixed by its outer margin to the fruitful veinlet and covering the cavity like a lid; veins more or less reticulate. Ours tall-growing ferns with ascending rhizomes and large fronds growing in a crown.

1. **W. Chamissoi** Brack. Frequent in all our canyons in wet, shaded places up to 1200 m.

6. ASPLENIUM. Spleenwort.

Sori oblong or linear, oblique, separate; indusium straight or slightly curved, attached to the upper side of a vein; veins free, simple or forked.

1. **A. vespertinum** Maxon. Not uncommon in moist, shady places in the mountains of San Diego county, *Parish;* Millard's Canyon; Santa Anita Canyon; San Gabriel Canyon.

7. ATHYRIUM. Lady Fern.

Rhizome stout; fronds large, oblong-ovate, bipinnate; sori curved, sometimes horse-shoe shaped, often crossing to the lower side of the fruiting veinlet.

1. **A. Filix-foemina** Roth. var. *californicum* Butters. Occasional about springs and streams and in bogs in the Transition Zone.

8. ADIANTUM. Maidenhair.

Sori marginal, short, covered by a reflexed portion of the margin of the pinnule, on the approximate tips of free, forking veins.

Fronds at least bipinnate, pinnules flabellate or cuneate; stipes black, polished, slender.

Fronds ovate-lanceolate, bipinnate below, the upper half or third simply pinnate; indusia lunulate, separated.......... 1. *A. capillus-veneris.*

Fronds ovate or deltoid-pyramidal, bi-tripinnate; pinnae rounded or reniform; sori linear-oblong, subcontinuous......... 2. *A. Jordani.*

Fronds dichotomously forked, with numerous pinnae springing from the upper side of the two branches; stipes dark chestnut-brown, glabrous; fronds nearly circular in outline; pinnules triangular-oblong, short-stalked; sori roundish or oblong................ 3. *A. pedatum.*

1. **A. capillus-veneris** L. Frequent on shaded dripping cliffs in the lower chaparral zone.

2. **A. Jordani** C. Muell. Common on moist, shaded banks in all our hills.

3. **A. pedatum** L. Wilson's Peak; Little Santa Anita Canyon; Snow Canyon, San Bernardino Mts., *Parish;* rare.

9. PTERIDIUM. Bracken.

Sori marginal, linear, continuous, occupying a slender filiform receptacle which connects the tips of the free veins; indusium double, the outer formed of the incurved margin of the pinnule and the inner attached within the receptacle and extending beneath the young sporangia.

1. **P. aquilinum pubescens** Underw. Common in springy ground in the upper Sonoran and Transition Zones.

10. CRYPTOGRAMMA.

Sporangia on the back or near the ends of the free veins, forming oblong or roundish sori which are at length confluent, covering the back of the pinnules; indusium continuous, formed of the membraneous margin of the pinnule, at first reflexed and the two margins meeting at the midrib, at length opening out flat.

1. **C. acrostichoides** R. Br. Rare in the alpine zones of all our mountains.

11. PELLAEA.

Sori intramarginal, terminal on the veins, at first dot-like or decurrent, later confluent forming a marginal band; indusium commonly broad and membranous, formed of the reflexed margin of the pinnule. Texture, in ours, coriaceous the veins commonly not perceptible.

Fronds simply pinnate; the ultimate segments broad and flat; indusium narrow, soon hidden by the fruit.......... 1. *P. bridgesii.*

Fronds bi-quadripinnate, ultimate segments oval or cordate, obtuse or emarginate.... 2. *P. andromedaefolia.*

Fronds tri-quadripinnatifid; segments linear-oblong; pinnules mucronulate or acute.

 Stipes tufted, dark brown; fronds very rigid, deltoid-lanceolate, bi-tripinnate; primary pinnae linear, bearing 4-16 pairs of trifoliate mucronulate pinnules; margins inflexed to the midrib in fertile fronds. .... 3. *P. mucronata.*

 Rootstock thick, short, densely chaffy; stipes tufted, purplish brown; fronds lanceolate to deltoid, trifoliate at apex, bipinnate below; pinnae short with 1-2 pairs of long, narrow pinnules beside the terminal one; mucro short; margins of fertile fronds inflexed to the midrib.............,... 4. *P. compacta.*

1. **P. bridgesii** *Hook.* An apparently rare species of mostly high altitudes. Dalton Canyon, San Gabriel Mts.

2. **P. andromedaefolia** Fee. Coffee fern. Common on rocky hillsides throughout our range.

3. **P. mucronata** D. C. Eaton. Common on dry hillsides. "Bird-foot cliff-brake." (*P. ornithopus* Hook.)

4. **P. compacta** Maxon. In rocky soil in the Transition and Canadian zones. Mt. San Antonio; San Bernardino Mts., *Parish.* (*P. wrightiana compacta* Davenp.)

12. CHEILANTHES.

Sori terminal or nearly so on the veins, at first small and roundish, afterward more or less confluent; indusium formed of the reflexed margin of the frond, roundish and distinct, or more or less confluent; veins free.

Indusia distinct, roundish, confined to the apex of a single veinlet; rootstock short, creeping, chaffy stipes dark brown, glossy, tufted; fronds deltoid-ovate, smooth on both surfaces, quadripinnatifid; segments lanceolate, acute, incised or serrate..... 1. *C. californica.*

Indusia more or less confluent, usually extending over the apices of several veinlets, but not continuous all round the segment; segments mostly flat, not bead-like.

 Segments of the frond glandular-viscid; pinnae numerous. .... 2. *C. viscida.*

 Segments somewhat hairy and glandular, not tomentose; fronds ovate-lanceolate; stipes brownish. .... 3. *C. cooperae.*

Indusium continuous all round the margin; fronds bi-quadripinnate, the lower surface scaly or tomentose or both; ultimate segments minute, bead-like.
  Fronds hairy or tomentose beneath, not scaly.
    Stipes tomentose, becoming glabrous............ 4. *C. feei.*
    Stipes and rachises covered with narrow scales.
      Rootstock forming dense tangled clumps of short rhizomes; fronds tripinnate, covered with a loose, deciduous tomentum, that along the rachises beneath persistent, tawny, mixed with coarse fibers......... 5. *C. fibrillosa.*
      Rootstock short creeping; fronds tri-quadripinnate, with both surfaces scantily clothed with coarse tomentum; segments roundish, the terminal ones larger and 3-lobed; indusia narrow, only partially enclosing the sori...................... 6. *C. parishii.*
  Fronds covered beneath with imbricated scales, not tomentose.
    Fronds many, closely placed upon the numerous short, thick branches of the rootstock; segments roundish or irregularly oval; without scales above, those beneath whitish to castaneous, large, exceeding the segments. .... 7. *C. covillei.*
    Fronds few, larger than the last, with shorter, lighter-colored stipes; rootstock more slender, with few short, slender branches; segments subcordate-orbicular. 8. *C. clevelandii.*

1. **C. californica** Mett. Common in all our mountains in shady places in the chaparral zone.

2. **C. viscida** Davenp. A strictly desert species found in shaded crevices of rocks in the lower altitudes of mountains bordering the Colorado Desert, acc. to *Parish.* Chino Creek.

3. **C. Cooperae** D. C. Eaton. Rather widely distributed but of very local occurrence; Santa Barbara, the type station, *Mrs. Ellwood Cooper;* Slover Mountain, near San Bernardino, *Parish.* Piru Creek.

4. **C. Feei** Moore. Rare on the Pacific coast. Providence Mts., San Bernardino Co., *Parish;* Mountain Spring, San Diego Co., *Schoenfeldt.*

5. **C. fibrillosa** Davenp. Known only from the type station, San Jacinto River at the point where it makes its exit from the mountains. Collected by *Parish.*

6. **C. Parishii** Davenp. Type collected by *Parish* in Andreas Canyon, near Palm Springs, in 1881. It was rediscovered in 1908

by *C. F. Saunders*, who secured a single plant. This and *C. fibrillosa* are probably the rarest of American ferns.

7. **C. Covillei** Maxon. Shaded clefts in the rocks of all our mountains, mostly above 800 m. altitude. Type collected by *F. V. Coville* in Surprise Canyon, Panamint Mts., Inyo Co., in 1891.

8. **C. Clevelandii** D. C. Eaton. Mountains of San Diego Co., north to Beaumont, Riverside Co., and south into Lower California, acc. to *Parish*. Type collected "on a mountain about forty miles from San Diego," in 1874, by *Daniel Cleveland*.

13. POLYPODIUM.

Sori round, naked, dorsal, in one or more rows each side of the midrib, or irregularly scattered; stipes articulated to the rhizome; fronds in our species once pinnatifid into linear-oblong obtuse or acute segments.

Veins free, 2- or 3-forked; pinnae elliptical or somewhat spatulate; sori large, borne midway between midvein and margin at the tip of the lowermost veinlet........... 1. *P. hesperium*.
Veins forming ample regular areolae, each with a single distinct free included veinlet, bearing a sorus at its tip; pinnae lanceolate, finely serrate.................... 2. *P. californicum*.

1. **P. hesperium** Maxon. In rock crevices in the Hudsonian Zone of the San Bernardino Mts., *Parish*; North side of Tahquitz Peak, San Jacinto Mts., *Kessler*.

2. **P. californicum** Kaulf. Common on shaded, rocky banks in the chaparral belt.

14. NOTHOLAENA.

Sori marginal, at first roundish or oblong, soon confluent into a narrow band, without indusium, but sometimes covered at first by the inflexed edge of the frond.

Fronds not farinose beneath.
  Fronds scaly, hairy, or tomentose beneath, silky-hairy above.
    Stipes dark brown, pubescent with whitish jointed hairs; fronds tripinnate; segments roundish-obovate, densely covered above with entangled white hairs, beneath with a heavier pale brown tomentum.......... 1. *N. parryi*.

Stipes blackish-brown, woolly when young with pale ferruginous tomentum; fronds tri-quadripinnate; segments roundish-obovate, covered beneath with fine, whitish hairs. .... 2. *N. newberryi.*

Fronds naked below, oblong-ovate to narrowly triangular, bipinnate; stipes curved, reddish-brown, sublustrous; pinnae few, opposite to alternate, with 1-2 pairs of roundish or subcordate pinnules a similar, but larger, terminal segment; glabrous. .... 3. *N. jonesii.*

Fronds farinose beneath with white or yellow powder, broadly pentagonal; stipes brown to light castaneous; segments broad rounded-obtuse. .... 4. *N. californica.*

1. **N. parryi** D. C. Eaton. Desert region of Southern California, extending to Arizona and Utah, in rock crevices or at their base.

2. **N. newberryi** D. C. Eaton. Crevices of rocks and at their bases in the hills of the coast mountains from near Los Angeles to Lower California. First collected by Newberry at San Diego.

3. **N. jonesii** Maxon. A rare and local fern of our desert region. Palm Springs; Cushenberry Springs, *Parish;* Panamint Canyon, Inyo Co., *M. E. Jones* (type).

4. **N. californica** D. C. Eaton. Somewhat rare and local. Slover Mountain, near Colton, *Parish;* San Bernardino, *W. B. Wright;* Palm Springs, *Kearney;* Mountain Spring, San Diego Co., *Schoenfeldt;* Catalina Island, *Trask;* near Victorville, *Kessler.*

15. PITYROGRAMMA.

Rootstock short; stipes densely tufted; fronds deltoid, pinnate, the lower surface covered with yellow or white powder; sori oblong or linear, following the course of the veinlets, without indusia.

Basal segments of the lowest pinnae usually elongate and pinnatifid; upper surface of frond glabrous; lower surface with yellow powder, rarely white or wanting........ 1. *P. triangularis.*

Basal segments of lowest pinnae usually only undulate-crenate, not pinnatifid; upper surface of the frond glandular and viscid; powder white, rarely pale yellow or wanting. .... 2. *P. viscosa.*

1. **P. triangularis** Maxon. Gold back Fern. Common in shaded places in the chaparral zone.

2. **P. viscosa** Maxon. Common on grassy slopes on Santa Catalina Island; frequent in the mountains near San Diego.

3. MARSILEACEAE.

Perennial plants rooted in mud, having a slender creeping rhizome and either 4-parted long petioled or filiform leaves; sporocarps containing both macrospores and microspores borne on peduncles which rise from the rhizome near or are more or less consolidated with the leaf stalks.

Leaves 4-parted .... 1. MARSILEA.
Leaves filiform...................................... 2. PILULARIA.

1. MARSILEA.

Plants with 4-parted leaves on slender petioles; sporocarps peduncled and rising either from the petioles or the rhizome at the base of the petiole, ovoid, 2-valved, several celled, containing both macrosporangia and microsporangia.

1. **M. vestita** Hook. & Grev. San Diego Co., *Orcutt;* San Bernardino Mts., *Munz.*

2. PILULARIA.

Plants with slender creeping rhizome and filiform leaves; sporocarps subsessile or peduncled on the rhizome in the axils of the leaves, globose, longitudinally 2-4 celled, dehiscent from the apex; cells with parietal cushions bearing in the upper portion microsporangia and below these numerous macrosporangia containing solitary macrospores.

1. **P. americana** A. Br. In winter pools on the mesas. Santa Barbara; San Diego; Upland, *Johnston.*

4. SALVINIACEAE.

Floating plants with a more or less elongated and sometimes branching axis bearing apparently distichous leaves; conceptacles very soft and thin-walled, 2 or more on a common stalk, 1-celled and having a central often branched receptacle which bears either macrosporangia containing solitary macrospores, or microsporangia containing numerous microspores.

1. AZOLLA.

Small moss-like plants the stems pinnately branched, covered with minute imbricating 2-lobed leaves, and emitting rootlets on the under side.

1. **A. filiculoides** Lam. Frequent on quiet pools.

5. EQUISETACEAE. Horsetail Family.

Rushlike, verticillately branched or unbranched plants, with jointed, mostly hollow stems; leaves reduced to a whorl of scales forming a sheath at the nodes; sporangia forming a terminal cone composed of peltate scales bearing several sporangia; spores all alike, supplied with coiled elaters attached at the middle and coiled spirally about the spore; prothalia terestrial, green, usually dioecious.

EQUISETUM. Horsetail.

Characters of the family.

Aerial stems of two kinds, one spore-bearing, the other vegetative; vegetative form much branched, green; spore-bearing form not branched, brown.

- Sterile stem .6-3 m. high, its branches several-angled, terete; fertile stem robust, the internodes usually without stomata, sheaths including the 20-30 long teeth 3-5 cm. long; cone 5-7 cm. long, its axis hollow.......................... 1. *E. telmateia.*
- Sterile stems usually less than 6 dm. high, the branches sharply 3- or 4-angled; fertile stem 1-3 dm. high, the internodes with stomata, the sheaths including the 7-15 teeth 2-5 cm. long; cone 3-5 cm. long, its axis solid when young.............. 2. *E. arvense.*

Aerial stems all green and essentially alike.

- Aerial stems evergreen, usually tall and rigid, many-grooved; ridges of the stem with two rows of tubercles; sheaths short, cylindrical, appressed, with a black ring around the limb and another at the base, the segments with a central groove, usually quadricarinate.......... 3. *E. hiemale.*
- Aerial stems annual.
  - Not with numerous branched basal sterile shoots around the fertile shoots; stems smooth, with cross bands of silex; limb of the long green sheath dilated upward, with a narrow black band at the top, not incurved .... 4. *E. kansanum.*

With a cluster of small, branched, sterile shoots around the base of the fertile shoots; stems rough, with cross bands of silex; limb of the rather short sheath incurved with age, with a narrow black band at the top; stomata often in two rows..... 5. *E. Funstoni.*

1. **E. telmateia** Ehrh. Occasional in moist, shady places. Arroyo Seco, *Peirson;* near San Bernardino, *Parish;* San Gabriel River, near Bassett, *L. Street.*

2. **E. arvense** L. Occasional and sometimes abundant in wet soils.

3. **E. hiemale** L. General throughout America.

4. **E. kansanum** Schaffn. Along mountain streams and in the cienegas.

5. **E. Funstoni** A. A. Eat. Occasional along streams.

6. ISOETACEAE. Quillwort Family.

Rush-like aquatic or littoral plants with a short solid corm like stem, and long subulate cellular leaves, the bases of which are expanded and have thin stipule-like infolded margins (the velum) which enclose large simple ovoid thin-walled sporocarps or sporangia; the outer ones containing large spheroid trivittate macrospores, and those of the inner leaves filled with minute obliquely oblong and triangular microspores.

1. ISOETES. Quillwort.

Characters of the family.

Leaves 15-20, 5-10 cm. long; macrospores with minute points and wrinkles.................... 1. *I. Bolanderi.*

Leaves 15-60, usually black at base, 12-30 cm. long; macrospores slightly wrinkled or almost smooth .... 2. *I. melanpoda.*

1. **I. Bolanderi** Engelm. Formerly in streams now submerged by Bear Valley Dam, *Parish.*

2. **I. melanpoda pallida** Engelm. Winter pools on the clay mesas near San Diego and Upland, *Johnston.*

7. SELAGINELLACEAE. Selaginella Family.

Moss-like plants, usually only a few centimeters high; stems slender, branching, erect or trailing; leaves small and scale-like, arranged in 4 to several ranks; sporangia 1-celled, globose, of two kinds, megasporangia bearing 4 megaspores and microsporangia bearing many microspores, borne at the bases of the sporophylls which differ but little from foliage leaves.

1. SELAGINELLA.

Characters of the family.

Stems erect or ascending, tufted, rooting only near the base; leaves about 6-ranked, appressed-imbricate, with a distinct dorsal channel, tapering to a spinulose white awn, margins with 12-15 cilia on either side; spikes on short lateral branches, obtusely quadrangular, the bracts short, broadly ovate.. 1. *S. Bigelovii.*

Stems creeping but not prostrate, rooting the entire length.

- Stems short, sparingly short-branched; leaves short, stout, with a deep dorsal channel, ending in a short, stout, green awn, the margins having few cilia or none; spikes 12-25 mm. long, sharply quadrangular, bracts broader at base, lanceolate-ovate to ovate, with shorter, stouter awns......... 2. *S. Watsoni.*
- Plant forming a loose mat; leaves ascending, subimbricate, awned (the awn about 1-3 as long as the rest of the leaf), having 16-23 cilia on each side; spikes numerous, 1-2 cm. long, 1.5-2 mm. thick, sharply quadrangular; megasporangia few, mostly basal; megaspores pale to bright yellow; microsporangia very numerous; microspores bright orange........... 3. *S. asprella.*

Stems prostrate, rooting the entire length; lateral branches short, forming a dense mat.

- Leaves closely appressed, cinereous, slightly grooved dorsally, the margins having 6-8 minute cilia; spike short, twice the diameter of the stem, the bracts broadly ovate, acute; megaspores pale yellow; microspores, usually on distinct spikes, dark orange......... 4. *S. bryoides.*
- Leaves crowded, subdimorphous, the largest below, ciliate but not awned, yellowish-brown; megasporangia few, basal; megaspores light yellow; microsporeangia numerous; microspores dull yellow .... 5. *S. eremophila.*
- Stems very short, simply pinnate, the divisions thick, erect; leaves crowded, appressed-imbricate, linear-subulate, with a stout white awn and 8-16 cilia on either side; spikes numerous, 5-10 mm. long, about 1.5 mm. thick, erect; megasporangia few, basal; megaspores bright yellow; microsporangia numerous; microspores orange...... 6. *S. leucobryoides.*

1. **S. Bigelovii** Underw. Common in all our mountains and higher foothills.

2. **S. Watsoni** Underw. In rock crevices in the Hudsonian and Alpine Zones of the San Bernardino Mts., *Parish;* Summit of Mt. San Gorgonio, *F. Grinnell, Jr.*

3. **S. asprella** Maxon. Mt. San Antonio and adjacent peaks. Type collected on the west end of Ontario Peak, by *Ivan M. Johnston.*

4. **S. bryoides** Underw. Coast mountains of San Diego County.

5. **S. eremophila** Maxon. Type collected in Palm Canyon, Riverside County, by *Ivan M. Johnston.* Mountain Spring, San Diego Co., *Mearns;* West Canyon, Riverside Co., *Parish;* Near Palm Springs, *Elizabeth Burnell.*

6. **S. leucobryoides** Maxon. Type collected near Bonanza Mine, Providence Mts., by *P. A. Munz* and *R. D. Harwood.*

ORDER PINALES.

Leaves needle-like; carpellary scales with bracts, never peltate; ovules inverted; cones dry. 1. PINACEAE.

Leaves scale-like or awl-like; carpellary scales without bracts, fleshy or peltate; ovules erect; cones berrylike.................. 2. JUNIPERACEAE.

PINACEAE. PINE FAMILY.

Leaves usually fascicled, surrounded at base by a sheath; cones maturing the second year. 1. PINUS.

Leaves not fascicled, without basal sheath; cones maturing the first year.
  Cones pendulous; leaves short-petioled............ 2. PSEUDOTSUGA.
  Cones erect; leaves sessile....................... 3. ABIES.

PINUS. PINE.

Evergreen trees with 2 sorts of leaves, the primary ones scale like, deciduous, bearing in their axils narrowly linear leaves in fascicles of 1 to 5, subtended by the bud-scales, some of which unite to form a sheath; staminate cones borne at the bases of the shoots of the season; ovulate cones solitary or clustered, borne on the twigs of the preceding year; cones maturing in the second autumn, reflexed or pendulous, their scales woody and imbricated.

- Sheaths of the leaves deciduous; leaves with 1 fibro-vascular bundle.
  - Leaves in 5's; cones with terminal unarmed umbos.
    - Leaves slender, 8-10 cm. long; cones cylindrical, 3-5 dm. long; seeds much shorter than the wings, these not persistent on the scale .... 1. *P. lambertiana.*
    - Leaves rigid, 3-6 cm. long; cones oval, about 1 dm. long; seeds much longer than the wings, these persistent on the scale...... 2. *P. flexilis.*
  - Leaves 1-4 in a cluster; cones globose; scales much thickened; seeds large; wings a mere ring.
    - Leaves usually in 4's.......................... 3. *P. quadrifolia.*
    - Leaves solitary .... 4. *P. monophylla.*
- Sheaths of the leaves persistent; leaves with 2 fibro-vascular bundles.
  - Leaves in 5's; wing thickened.................. 5. *P. Torreyana.*
  - Leaves 2 or 3 in a cluster; wing thin.
    - Leaves in 3's.
      - Cone scales with dorsal slender prickles.
        - Cones symmetrical, opening at maturity, deciduous, the basal scales remaining on the stem.
          - Leaves yellow-green; twigs not glaucous; cones 7-15 cm. long.................. 6. *P. ponderosa.*
          - Leaves dull blue-green; twigs glaucous; cones 15-36 cm. long.................. 7. *P. Jeffreyi.*
        - Cones unsymmetrical, their outer scales much enlarged toward the base of the cone, remaining closed and persistent on the branches for many years.......... 8. *P. attenuata.*
      - Cone scales prolonged into stout, straight or incurved spur-like spines; cones large and heavy.
        - Leaves gray-green, drooping; cones chocolate-brown; seeds longer than wings....... 9. *P. sabiniana.*
        - Leaves blue-green, erect; cones light-brown; seeds shorter than wings..............10. *P. Coulteri.*
    - Leaves in 2's; cones small, opening at maturity and deciduous................11. *P. Murrayana.*

1. **P. Lambertiana** Dougl. Sugar pine. Frequent in the Transition Zone of all our mountains.

2. **P. flexilis** James. Limber pine. Summits of San Gorgonio, San Jacinto and Santa Rosa Mountains.

3. **P. quadrifolia** Parl. Parry pine. Santa Rosa Mts., southward on the desert slopes to northern Lower California.

4. **P. monophylla** Torr. & Frem. Pinon. Frequent on the desert slopes of the San Gabriel and San Bernardino Mountains.

5. **P. Torreyana** Parry. Torrey pine. Del Mar, San Diego County; Santa Rosa Island. This is the rarest of all the pines.

6. **P. ponderosa** Dougl. Yellow pine. Common on all our mountains, making up a great part of the coniferous forest.

7. **P. Jeffreyi** Oreg. Comm. Jeffrey pine. With the last, but less common. Rather frequent about Bear Valley.

8. **P. attenuata** Lemmon. Knob-cone pine. Extending in a narrow belt along the southern slope of the San Bernardino Mts., in the vicinity of City Creek Canyon, acc. to *Abrams*.

9. **P. sabiniana** Dougl. Digger pine, or Silver pine. Antelope Valley and northward. Confined to the foothills.

10. **P. Coulteri** Lamb. Coulter pine. Frequent in the coniferous forests of the San Bernardino, San Jacinto and Cuyamaca Mountains. Less so in the San Gabriel range.

11. **P. Murrayana** Oreg. Comm. Murray, or Tamrac pine. Upper part of the coniferous forest. Mt. San Antonio; Mt. San Gorgonio; Mt. San Jacinto.

PSEUDOTSUGA.

Large evergreen trees with solitary, short-petiolate, flat, obtuse leaves which leave an oval scar on the smooth branches; cones ovate oblong, pendulous, the acutely 2 lobed and aristulate bracts longer than the scales.

1. **P. macrocarpa** Mayr. Big-cone spruce. In the upper altitudes of the Upper Sonoran and the lower altitudes of the Transition Zones, from the Santa Ynez Mountains and Fort Tejon to Lower California.

ABIES.

Large evergreen trees with flat, sessile, blunt leaves so arranged as to make the branches appear flat; cones erect, cylindrical, borne near the top of the tree, their scales thin and deciduous.

1. **A. concolor** Parry. White fir. Frequent in the coniferous forests of the San Gabriel, San Bernardino, San Jacinto and Cuyamaca Mountains.

JUNIPERACEAE. Juniper Family.

Trees or shrubs with much imbricated, short, scale-like or awl-like leaves; cones composed of fleshy or peltate scales without bracts; fruit berry-like, dehiscent or indehiscent.

- Monoecious; cone-scales woody.
  - Leaves in whorls of 4; cones and scales oblong.... 1. Libocedrus.
  - Leaves opposite; cones globose; scales peltate..... 2. Cupressus.
- Dioecious; leaves opposite; cones berry-like, their scales becoming fleshy................. 3. Juniperus.

LIBOCEDRUS. Incense Cedar.

Evergreen aromatic trees with thin fibrous bark and flattened branches; leaves scale-like; mature cones oblong, scales oblong; seeds unequally 2-winged, maturing the first year.

1. **L. decurrens** Torr. Frequent in the coniferous forests of the San Gabriel, San Bernardino, San Jacinto and Cuyamaca Mts.

CUPRESSUS. Cypress.

Resinous aromatic trees with fibrous bark and light brown, durable, fragrant wood; branches erect or horizontal; leaves scale-like, decussate, ovate, acute, acuminate or rounded at the apex; cones maturing the second year, globose to oblong, the scales thickened into a peltate apex bearing a prominent central boss or prickle, closely fitting but not overlapping, dehiscent; seeds small, compressed, acutely angled.

1. **C. guadalupensis** Wats. Guadalupe Cypress. Southern and western San Diego County, northern Lower California and on Guadalupe Island.

JUNIPERUS. Juniper.

Low shrubs or trees with thin, shredded bark, awl-shaped or scale-like leaves; cones indehiscent, fleshy or fibrous; seeds 1-12, ovoid, bony.

- Seeds 1 or 2; cotyledons 4-6.
  - Leaves rounded at the apex, conspicuously glandular on the back.................. 1. *J. californica.*
  - Leaves acute or acuminate, glandless.............. 2. *J. utahensis.*
- Seeds 2 or 3; cotyledons 2; leaves conspicuously glandular on the back................ 3. *J. occidentalis.*

1. **J. californica** Carr. In southern California this is chiefly found on the desert slopes of the mountains, entering the coastal region only in the arid regions. About Los Angeles it has been found near Azusa and in the San Fernando Valley.

2. **J. utahensis** Lemmon. This occurs in our region in the eastern part of the Mohave Desert, on the Providence Mountains, acc. to Abrams.

3. **J. occidentalis** Hook. In southern California this is found chiefly above the Yellow Pine belt; Mt. San Anonio, near the summit; San Bernardino Mts.

ORDER GNETALES.

EPHEDRACEAE. Joint-fir Family.

Shrubs or small trees of various habit, mostly with jointed opposite or fascicled branches and foliaceous or scale-like opposite (or ternate) exstipulate leaves, the flowers mostly dioecious, with persistent bracts; the staminate in aments; the pistillate consisting of an erect sessile ovule terminated by an exserted style-like process, included within an urceolate perianth which becomes hardened and often thickened in fruit.

EPHEDRA. Mexican Tea.

Shrubs 2 meters high or less, with slender terete striate stems; leaves reduced to small scarious bracts disposed in whorls at the nodes; flowers dioecious; fruit consisting of one or more seeds inclosed in few or many, chaffy, brownish or greenish scales.

Scales and bracts in 2's. 1. *E. viridis.*
  Branches bright green, erect and broom-like...... 2. *E. nevadensis.*
  Branches pale glaucous green, divergent..........
Scales and bracts in 3's.
  Catkins subglobose, 6 to 8 mm. long.............. 3. *E. californica.*
  Catkins slender-ovate, 10 to 12 mm. long......... 4. *E. trifurca.*

1. **E. viridis** Coville. Western slope of the Mohave Desert, eastward to Nevada; Pinon belt of the mountain slopes of the Mohave Desert; Prairie Fork of the San Gabriel River, *Johnston.*

2. **E. nevadensis** Wats. In southern California this species is characteristic of the juniper and yucca belts of the deserts.

3. **E. californica** Wats. Mohave Desert southward to Lower California; extending to the coast near San Diego and southward.

4. **E. trifurca** Torr. Mohave River at Daggett, *Jepson.*

ORDER PANDANALES.

Flowers in elongated terminal spikes; fruit hidden among bristles .... 1. Typhaceae.
Flowers in globose lateral spikes; fruit not hidden among bristles .... 2. Sparganiaceae.

1. TYPHACEAE. Cattail Family.

Tall marsh plants with creeping rootstocks, and smooth terete stems, with alternate, narrow flat leaves; flowers monoecious in dense spikes; the pistillate flowers below and the staminate above; stamens 1-7; ovary usually 1-celled, more or less stalked; ovule solitary; fruit dry, nutlike.

1. TYPHA.

Characters of the family.

Spikes light-brown, the staminate and pistillate usually distant .... 1. *T. angustifolia.*
Spikes dark-brown, the staminate and pistillate usually contiguous .... 2. *T. latifolia.*

1. **T. angustifolia** L. Narrow-leaved Cattail. In a few places on the margins of pools and streams near Los Angeles and San Bernardino. June, July.

2. **T. latifolia** L. Broad-leaved Cattail. Frequent along marshes and slow streams. May, June.

2. SPARGANIACEAE. Bur-reed Family.

Perennial monoecious, marsh or aquatic plants, with creeping rootstocks and erect terete stems, immersed or floating; leaves linear, alternate, flat and sheathing at the base; flowers in dense globose heads, sessile or peduncled, the staminate uppermost; stamens 5; pistils 1 or 2; fruit nut-like, obovoid or spindle shaped, 1 or 2 seeded.

SPARGANIUM. Bur-reed.

Characters of the family.

Achenes cuneate, sessile....................... 1. *S. eurycarpum.*
Achenes obovoid, sessile....................... 2. *S. Greenei.*
Achenes fusiform, stipitate.................... 3. *S. angustifolium.*

1. **S. eurycarpum** Engelm. Along slow streams and irrigation ditches near Los Angeles. May, June.

2. **S. Greenei** Morong. Ballona Marsh.

3. **S angustifolium** Michx. Bluff Lake, San Bernardino Mts., Parish.

ORDER NAIADALES.

Ovary 1, sessile.
  Flowers dioecious; perianth none in the fertile flowers, cup-shaped in the staminate. 1. Naiadaceae.
  Ovaries naked on an enclosed spadix........... 2. Zosteraceae.
  Fertile flowers in an exserted slender spike.... 3. Lilaeaceae.
Ovaries about 4, nearly sessile.................. 4. Zannichelliaceae.

1. NAIADACEAE. NAIAS FAMILY.

Slender branched marine or fresh-water herbs, entirely submerged; roots fibrous; leaves alternate, opposite or whorled, spiny on the margin, back or both; flowers inconspicuous, monoecious or dioecious, sessile or pedicellate, solitary in the axils; stamen 1 sessile; mature carpel solitary, sessile ellipsoid with a crustaceous pericarp.

1. NAIS.

Characters of the family.

Flowers dioecious, internodes spiny, leaves coarsely toothed .... 1. *N. marina.*
Flowers monoecious, leaves minutely toothed......... 2. *N. flexilis.*

1. **N. marina** L. Holly-leaved Naiad. San Diego.

2. **N. flexilis** R. & S. Slender Naiad. Ponds, Garvanza and Soldier's Home.

2. ZOSTERACEAE.

Perennial maritime plants with creeping rootstocks and flattened, branching stems; leaves all alternate, 2-ranked, linear, flat or complicate, sheathing at the base; flowers monoecious or dioecious, arranged on a one-sided spadix and enclosed in a close-fitting, ultimately rupturing spathe; perianth none, but some of the flowers covered by a hyaline envelope; staminate flower of a single sessile, 1-celled anther; pistillate flower of two united carpels.

Flowers monoecious; fruit ovoid.................... 1. ZOSTERA.
Flowers dioecious; fruit sagittate-cordate........... 2. PHYLLOSPADIX.

1. ZOSTERA. EEL-GRASS. GRASS-WRACK.

Submerged maritime plants with grass-like leaves: flowers monoecious, borne in two rows on the spadix; nutlet ovoid.

1. **Z. marina** L. In shallow waters of bays at San Pedro and Santa Barbara.

2. PHYLLOSPADIX.

Slender, much branched, submerged salt-water plants; leaves long, grass-like; inflorescence a peduncled one-sided spadix enclosed in a sheathing spathe which splits at maturity, flowers dioecious but otherwise as in *Zostera;* fruit deeply cordate sagittate at the base.

1. **P. Torreyi** Wats. On low tide rocks, La Jolla; Balboa; San Pedro and Santa Barbara (type locality).

3. LILAEACEAE.

Sub-aquatic annual with fibrous roots and radical terete sheathing leaves; flowers perfect or unisexual, basal or in spikes raised on scapes, basal flowers pistillate enclosed by the sheathing leaf-bases; staminate flowers of a single stamen; pistillate flowers of a single pistil, the lower ones with a long style, the others shorter; fruit oblong-ovate, winged, those in the axils of the basal leaves wingless.

1. LILAEA.

Characters of the family.

1. **L. subulata** H. & B. In muddy pools near Colton. San Diego and adjacent mountains.

4. ZANNICHELLIACEAE. Pondweed Family.

Perennial marine or fresh-water plants with floating or submerged leaves, or both; leaf-blades petioled or sessile, capillary or expanded into a proper blade, or rarely reduced to terete phyllodia; flowers perfect or monoecious, in sessile or peduncled spikes, or in clusters in the axils of the leaves; perianth none; stamens 1-4; ovaries 1-4, carpels 1-seeded; fruits nut-like.

Flowers monoecious, stamens 1.................... 1. Zannichellia.
Flowers perfect in spikes or clusters.
  Stamens 2; fruit stipitate........................ 2. Ruppia.
  Stamens 4; fruit sessile......................... 3. Potamogeton.

1. ZANNICHELLIA. Horned Pondweed.

Slender, submerged plants with linear entire, mostly opposite leaves; flowers sessile, axillary, the staminate with 1 stamen, pistillate flowers 2-5; stigma cup-shaped; fruit an oblong indehiscent nutlet.

1. **Z. palustris** L. Ponds and slow streams, Los Angeles. April-May.

2. RUPPIA. Ditch-grass.

Perennial submerged marine or fresh-water herbs, with linear, almost capillary leaves, broader and sheathed at the base; flowers perfect, the peduncle enclosed in the spathe-like base of the leaf; stamens 2, anthers 2-celled sessile; carpels 4, sessile, becoming stipitate; stigmas sessile. The flowers at the period of anthesis rise to the surface, afterward recoiling to submerge the mature fruit.

1. **R. maritima** L. Brackish streams along the coast. June-July.

3. POTAMOGETON. Pondweed.

Aquatic herbs, wholly or partially submerged; leaves frequently of two kinds, the floating coriaceous, the submerged semi-pellucid or reduced to linear leaf blades or terete phyllodia; stipules free or adnate to the leaf bases; flowers spicate; sepals and stamens 4; ovaries 4.

Plants with floating and submerged leaves.
  Submerged leaves without blades.
    Fruiting peduncles all emersed................. 1. *P. natans.*
    Fruiting peduncles emersed and submerged..... 2. *P. dimonphus.*
  Submerged leaves with blades; leaves linear and pellucid .... 3. *P. americanus.*
Plants with submerged leaves only.
  Stipules adnate to the leaf-bases................. 4. *P. pectinatus.*
  Stipules free from the leaf-bases.
    Nutlets with keels obscure or wanting.......... 5. *P. pusillus.*
    Nutlets with dentate keel...................... 6. *P. foliosus.*

1. **P. natans** L. Common floating Pondweed. Bear Valley, San Bernardino, *Parish.*

2. **P. dimorphus** Raf. Lake Surprise, San Jacinto Mts., *Hall.*

3. **P. americanus** C. & S. Ponds at Garvanza and near Balboa.

4. **P. pectinatus** L. Fennel Pondweed. Not common but widely distributed in ponds and slow streams. July-August.

5. **P. pusillus** L. Slender Pondweed. Los Angeles River. August.

6. **P. foliosus** Raf. Southern California from San Bernardino to San Diego, *Jepson.*

ORDER ALISMALES.

Petals and sepals unlike, the former white; anthers short and thick; carpels not coherent .... 1. Alismaceae.
Petals and sepals similar; anthers long and narrow; carpels coherent.............. 2. Scheuchzerlaceae.

ALISMACEAE. Water-plantain Family.

Annual or perennial marsh herbs with oval or sagittate leaves, all basal, with petioles sheathing at the base; flowers perfect or unisexual, regular, whorled, borne in terminal racemes or panicles; calyx of 3 persistent sepals; petals 3 white or pink;

stamens 6 or more; ovaries numerous, becoming 1-seeded achenes.

Leaf-blades ovate or oblong.
  Carpels on a ring on a flat receptacle.............. 1. ALISMA.
  Carpels crowded on a convex receptacle........... 2. ECHINODORUS.
Leaf-blades sagittate.
  Flowers polygamous, the lower perfect or pistillate, the upper staminate.
    Lower flowers perfect.......................... 3. LOPHOTOCARPUS.
    Lower flowers pistillate........................ 4. SAGITTARIA.

1. ALISMA. WATER-PLANTAIN.

Perennial with long-petioled leaves, ovate or oblong, acute blades; flowers perfect in a compound panicle; petals small, white, scarcely exceeding the sepals; stamens 6; achenes numerous, crowded in a discoid whorl.

1. **A. brevipes** Greene. Railway ditch near Dominguez Junction, Los Angeles. August.

2. ECHINODORUS.

Marsh herbs, ours annual, with broadly ovate leaves with cordate or truncate base: flowers perfect on short pedicels in umbel-like whorls; stamens 6-12 or more; fruit forming a bristly head, the achenes beaked by the persistent straight or curved style.

Pedicels straight; beak of achene long...........:. 1. *E. cordifolius.*
Pedicels curved; beak of achenes short............ 2. *E. radicans.*

1. **E. cordifolius** Griseb. Limited to a few localities, on the edges of ponds and lakes, Garvanza; Alamitos; Elsinore; Lakeside. Aug.

2. **E. radicans** Engl. Southern California acc. to *N. Am. Fl.*

3. LOPHOTOCARPUS.

Aquatic plants with the general appearance of *Sagittaria,* but the lower flowers of the inflorescence, perfect instead of pistillate.

Fruiting pedicels more than 2 cm. long............ 1. *L. fluitans.*
Fruiting pedicels less than 2 cm. long............. 2. *L. californicus.*

1. **L. fluitans** Smith. Ballona Creek; Los Angeles, July-August.

2. **L. californicus** Smith. Coyote Creek, Los Angeles Co. Type locality.

4. SAGITTARIA. Arrow-head.

Marsh and aquatic perennial herbs, with long-petioled sheathing leaves with sagittate blades; stems simple, bearing flowers in whorls of 3, the staminate flowers above, the pistillate below; ovaries many, on a globular receptacle, becoming flat, membranous, winged achenes.

Achenes with horizontal beak...................... 1. *S. latifolia.*
Achenes with minute erect beak.................... 2. *S. cuneata.*

1. **S. latifolia** Willd. Tule Potato. Occasional in zanjas and along stream borders Los Angeles and San Bernardino, 1890.

2. **S. cuneata** Sheld. Bluff Lake; San Bernardino Mts., *Parish.*

SCHEUCHZERIACEAE. Arrow-grass Family.

Perennial marsh herbs with rush-like leaves and small spicate or racemose perfect flowers; perianth regular, 4-6-parted, in ours the 3 outer segments or sepals resembling the 3 inner segments; stamens 3-6; ovaries 3-6, united, the carpels dehiscent or indehiscent.

1. TRIGLOCHIN. Arrow-grass.

Marsh herbs, the grass-like leaves, and membranous sheaths clustered at the base of the scape-like stem, flowers small spicate, with 3 ovate sepals and 3 similar petals; stamens in ours 6; ovaries united, splitting at maturity into 3 or 6 carpels.

Carpels 3; fruit nearly globose..................... 1. *T. striata.*
Carpels 6; fruit ovoid.............................. 2. *T. maritima.*

1. **T. striata** R. & P. Southern California, *N. Am. Fl.*

2. **T. maritima** L. Common in salt marshes along the coast, and in moist alkaline soils in the interior. April-May.

ORDER POALES.

Leaves 2-ranked; margins of sheaths not united; stems mostly hollow.................. 1. Poaceae.
Leaves 3-ranked; margins of sheaths united; stems solid .... 2. Cyperaceae.

1. POACEAE. Grass Family.

Annual or perennial herbaceous or shrubby plants with usually hollow stems, closed at the nodes and 2-ranked leaves consisting of two parts, the sheath which envelopes the stem and the blade, which is free, is parallel veined; the ligule at the junction of blade and sheath membranaceous or hyaline; inflorescence a panicle, raceme or spike; flowers usually perfect, small, without a distinct perianth, arranged in spikelets consisting of a shortened axis (rachilla) and many 2-ranked bracts, the lower 2 (glumes) empty, each succeeding bract (the lemma) containing in its axil a single flower subtended by a palea; stamens usually 3; pistil 1, with a 1-celled, 1-ovuled ovary, 2 styles, and plumose stigmas; fruit a caryopsis with a starchy endosperm and a small embryo.

Subfamily 1. PANICOIDEAE.

Spikelets dorsally compressed, falling from the pedicels entire, 1-flowered, or sometimes with a rudimentary flower below the perfect one.

Lemma and palea hyaline, much more delicate in texture than the glumes.

Spikelets in pairs, one sessile, the other pedicellate, the former perfect, the latter perfect or with a staminate flower, often reduced to 1 or 2 scales.............. I. Andropogoneae

Spikelets round or dorsally compressed; lemmas, at least those of the perfect flowers, similar in textures to the glumes or thicker and firmer, never hyaline.

Spikelets in groups of 3, these falling together from the continuous axis............. II. Zoysieae.

Spikelets various.............................. III. Paniceae.

Spikelets laterally compressed..................... IV. Oryzeae.

Spikelets laterally compressed, at least at maturity, the glumes usually persistent on the pedicel or rachis after the fall of the florets, 1 to many-flowered, the rudimentary flower, if any, usually uppermost ....

Spikelets in 2 rows, sessile or nearly so.

Spikelets on one side of the continuous axis, forming one-sided spikes, these digitate or paniculate ....VIII. Chlorideae.

Spikelets alternate on opposite sides of a channeled, sometimes articulated, axis; spikes solitary .... X. Hordeae.

Spikelets borne in an open or spikelike panicle or raceme, usually on distinct pedicels.

Spikelets with 1 perfect flower.

No rudimentary or staminate floret below the perfect one .... V. Phalarideae.

A pair of rudimentary or staminate florets below the perfect one................ VI. Agrostideae.

Spikelets 2 to many-flowered.
  Lemmas usually shorter than the glumes; awn dorsal or between the teeth of the bidentate apex, usually bent............ VII. Aveneae..
  Lemmas usually longer than the glumes; awn terminal (rarely dorsal in *Bromus*) and straight, or none.................... IX. Festuceae.

Tribe I. ANDROPOGONEAE.

Spikelets awnless .... 1. Imperata.
Spikelets awned.
  Inflorescence of spike-like silky racemes.
    Racemes sessile .... 2. Andropogon.
    Racemes pedunculate .... 3. Amphilopsis.
  Inflorescence of paniculate spikelets in 3's........ 4. Holcus.

1. IMPERATA.

Tall glabrous perennial with villous ligule and dense, silky panicle 15-30 cm long; spikelets 1-flowered in pairs on unequal articulate pedicels; glumes 2, clothed with long, silky hairs; lemmas membranaceous; palea truncate, toothed.

1. **I. Hookeri** Rupr. Colorado Desert.

2. ANDROPOGON.

Coarse perennials with spike-like racemes; spikelets in pairs or digitately in 5's or less, usually with a ring of hairs at the base, one sessile and fertile, the other pedicellate and sterile; glumes indurate, equal; lemmas awned.

1. **A. tenuispatheus** Nash. .(A. macrourus pumilus Vasey.) Frequent on the Colorado Desert; Arrowhead Hot Springs, *Parish;* entrance of Rubio and Eaton Canyons, probably introduced there.

3. AMPHILOPSIS.

Tufted perennials with flat leaves and silvery white panicles, these fan-shaped; racemes pedunculate; first glume 2-keeled, the second 1-keeled; lemmas tapering to an awn; stamens 3.

1. **A. saccharoides** Nash. On rocky southern slopes of the coast range from Santa Barbara to San Diego; not common.

4. HOLCUS.

Tall glabrous grasses with broad flat leaves and large decompound terminal panicles; sessile spikelets 1-flowered, perfect, the pedicellate staminate; glumes hard and shining; pertile lemma bearing a geniculate awn; palea minute.

Pedicelled spikelet usually staminate, equalling the sessile .... 1. *H. halepensis.*
Pedicelled spikelet usually empty, shorter than the sessile one .... 2. *H. Sorghum.*

1. **H. halepensis** L. Johnson-grass. A forage grass tending to become a weed in moist ground. Introduced in 1884.

2. **H. Sorghum** L. Sorghum. An occasional escape.

TRIBE II. ZOYSIEAE.

5. PLEURAPHIS.

Decumbent perennial with wiry-felty pubescent leaves and terminal spikes; spikelets in groups of 3's at each joint, these all falling off together; central spikelet 1-flowered, perfect, lateral spikelets staminate, 1 or 2-flowered; glumes several awned from the tip. (*Hilaria* H.B.K.)

1. **P. rigida** Thurb. Mohave and Colorado Deserts.

TRIBE III. PANICEAE.

Spikelets not surrounded by bristles or a spiny involucre.
  Inflorescence digitate .... 6. DIGITARIA.
  Inflorescence of one-sided spikes.................. 7. PASPALUM.
  Inflorescence a panicle.
    Fruit not pointed.............................. 8. PANICUM.
    Fruit pointed or awned......................... 9. ECHINOCHLOA.
Spikelets surrounded by bristles or spiny involucre.
  Involucre of numerous persistent bristles..........10. CHAETOCHLOA.
  Involucre a spiny bur falling with the spikelet.....11. CENCHRUS.

6. DIGITARIA. CRAB-GRASS.

Annual grass with thin flat leaves and subdigitate inflorescence of racemes at the top of the stem; spikelets with 1 perfect flower, solitary or in 2's or 3's, in 2 rows on one side of the narrow rachis; glumes 1-3-nerved; sterile lemmas 5-nerved, fertile lemma indurate with a hyaline margin (*Panicum.* L.).

1. **D. sanguinale** Scop. Common along ditches and moist roadsides. A native of Europe, long established.

7. PASPALUM.

Erect or decumbent perennial grasses with flat leaves and creeping rootstocks; spikelets 1-flowered, nearly sessile, in 2-4 rows forming one-sided racemes, these either solitary or in pairs or digitate; glumes awnless, the first usually wanting.

Spikes, 2 or 3, at the top of the culm............... 1. *P. distichum.*
Spikes many, scattered along the culm.............. 2. *P. dilatatum.*

1. **P. distichum** L. Common along streams and borders of marshes especially near the coast.

2. **P. dilatatum** Poir. Well established on roadsides, Santa Ana and near Whittier, 1917.

8. PANICUM. Panic Grass.

Annuals or perennials of various habits in usually slender panicles; spikelets of 1 perfect floret and a second staminate or neutral floret below; glumes unequal, the first often minute, the second equalling the sterile lemma; fertile lemma and palea indurated, the former inrolled at the margins.

Annual.
  Fruit transversely rugose.
    Inflorescence of several spike-like racemes....... 1. *P. arizonicum.*
  Fruit smooth.
    Inflorescence a more or less diffused panicle.
      Panicles more than half the length of the entire plant .... 2. *P. capillare.*
      Panicles not more than one-third the length of the plant .... 3. *P. hirticaule.*
Perennial.
  Spikelets silvery-villous, 6 mm. long.............. 4. *P. urvilleanum.*
  Spikelets pubescent, 2 mm. long.
    Vernal blades glabrous above.................. 5. *P. occidentale.*
    Vernal blades pilose above..................... 6. *P. pacificum.*
    Vernal blades adpressed-pubescent............. 7. *P. huachucae.*

1. **P. arizonicum** S. & M. Jamacha, San Diego Co., *Jepson.*

2. **P. capillare brevifolium** Vasey. In dry, sandy soils, not common.

3. **P. hirticaule** Presl. Jamacha, San Diego Co.

4. **P. urvilleanum** Kunth. Common on the Mohave and Colorado Deserts and in the interior valleys.

5. **P. occidentale** Scribn. Peat bogs and sandy soil, San Diego to British Columbia, *Jepson.*

6. **P. pacificum** Hitch. & Chase. Moist shady places, San Bernardino Mts.; San Gabriel Canyon.

7. **P. huachae** Ashe. San Bernardino Mts., *Abrams.*

9. ECHINOCHLOA.

Coarse annuals with compressed sheaths, long flat leaves and terminal panicles of stout racemes; spikelets 1-flowered, nearly sessile; glumes unequal, spiny, hispid, mucronate; sterile lemma awned from the apex; fertile lemma acuminate. (*Panicum* L.)

Spikes simple, spikelets awnless..................... 1. *E. colona.*
Spikes compound, spikelets awned.................. 2. *E. crusgalli.*

1. **E. colona** Link. Occasional in wet places San Diego; Santa Ana; Los Angeles. Abundant in the Salton district, *Parish*. Visalia 1881.

2. **E. crusgalli** Beauv. Barnyard Grass. A weed in cultivated and moist grounds. Native of Europe.

10. CHAETOCHLOA. Bristly Foxtail.

Erect annuals or perennials with bristly spike-like panicles, spikelets as in *Panicum*, but surrounded by persistent awns; glumes awnless; fruit rugose. (*Setaria*.)

- Perennial.
  - Bristles below each spikelet, 5 or more............ 1. *C. geniculata.*
- Annual.
  - Bristles below each spikelet, 1-3.
    - Bristles more or less retrorsely scabrid........ 2. *C. verticillata.*
    - Bristles antrorsely scabrid only................ 3. *C. viridis.*

1. **C. geniculata** (Lam.) Millsp. & Chase. Becoming increasingly frequent in lawns and along moist roadsides, Pomona; Riverside; Los Angeles. 1892.

2. **C. verticillata** Scribn. Upland, *Johnston*. 1918.

3. **C. viridis** Scribn. Rialto, *Parish;* occasional on street borders, Los Angeles. 1917.

11. CENCHRUS. Sand Bur.

Annual with stout erect culms and "burs" crowded in a terminal spike; spikelets 1-flowered; involucre spiny, falling away with the spikelets; glumes awnless.

1. **C. tribuloides** L. San Bernardino, *Parish;* Huntington Park; Colton. 1890.

Tribe IV. ORYZEAE.

12. HOMALOCENCHRUS.

Marsh grass with flat leaves and paniculate inflorescence; spikelets 1-flowered, perfect, strongly flattened laterally; outer glume larger. (*Leersia* Sw.)

1. **H. oryzoides** Poll. San Bernardino, *Parish*. 1885.

Tribe V. PHALARIDEAE.

- Panicle dense and contracted; sterile lemma narrow, shorter than the fertile lemma.........13. Phalaris.
- Panicle spike-like; sterile lemma awned, longer than the fertile lemma......................14. Anthoxanthum.

13. PHALARIS. Canary Grass.

Ours annuals with flat leaves and dense spike-like or capitate inflorescence; spikelets 1-flowered; glumes green striped, equal, usually awnless, winged on the keel; lemmas hard and shining, investing the grain and palea.

Glumes short awned; fertile lemmas smooth; sheaths large enclosing spike .... 1. *P. paradoxa.*
Glumes acuminate; fertile lemmas villous except the tip .... 2. *P. Lemmoni.*
Glumes acute; fertile lemmas villous throughout.
  Panicle 2.5-5 cm. long.......................... 3. *P. caroliniana.*
  Panicle 5-10 cm. long........................... 4. *P. angusta.*
Glumes oblong; lemmas villous.
  Sterile lemma solitary, fertile 3 mm. long........ 5. *P. minor.*
  Sterile lemmas in pairs, fertile 4-6 mm. long...... 6. *P. canariensis.*

1. **P. paradoxa praemorsa** Coss. & Dur. Well established in many places along roadsides and in adobe soils; San Diego. 1902.

2. **P. Lemmoni** Vasey. Meadow lands from South Los Angeles to Inglewood; San Diego; Catalina Island.

3. **P. caroliniana** Walt. Ojai Valley; the Channel Islands, *Jepson;* Palms, 1901.

4. **P. angusta** Nees. San Bernardino, *Parish;* Fallbrook, *Abrams.*

5. **P. minor** Retz. Roadsides and wastes from San Bernardino to San Diego, in some places abundant. San Bernardino, 1882.

6. **P. canariensis** L. Occasional escape.

14. ANTHOXANTHUM. Fragrant Vernal Grass.

Fragrant perennial grass with flat leaves and spike-like panicles; spikelets 1-flowered; glumes unequal; sterile lemmas 2, 2-lobed and dorsally awned; fertile lemmas awnless.

1. **A. odoratum** L. Occasional in lawns, Los Angeles, 1890.

Tribe VI. AGROSTIDEAE.

Lemma awned or awn-pointed.
  Awn terminal.
    Awn trifid .... 15. Aristida.
    Awn simple.
      Awn twisted and bent, usually 15 mm. or more long. .... 16. Stipa.
      Awn not twisted or wanting.
        Lemma broad; awns deciduous............ 17. Oryzopsis.

      - Lemma narrow; awns when present, persistent .... 18. Muhlenbergia.
- Lemma awnless or dorsally awned.
  - Glumes conspicuously compressed-keeled; spikelets in dense spike-like panicles.
    - Lemma awnless; glumes awned................ 19. Phleum.
    - Lemma dorsally awned; glumes awnless......... 20. Alopecurus.
  - Glumes not compressed-keeled.
    - Pericarp separating from the seed; panicle open. 21. Sporobolus.
    - Pericarp adherent to the seed.
      - Glumes awnless; panicle spike-like, 30 cm. long or more .... 22. Epicampes.
      - Glumes long-awned; panicles dense........... 23. Polypogon.
      - Glumes saccate at base...................... 25. Gastridium.
      - Glumes not saccate at base.
        - Rachilla prolonged behind the palea; lemma dorsally awned .... 26. Calamagrostis.
        - Rachilla not prolonged behind the palea.... 24. Agrostis.

15. ARISTIDA. Triple-awned Grass.

Tufted annuals or perennials with narrow leaves; spikelets 1-flowered, on slender pedicels in narrow or open panicles; glumes acuminate or short awned, unequal; lemma convolute, enclosing the floret and the short palea and terminating in a usually trifid awn.

- Annual; awns about 10 mm. long.................. 1. *A. bromoides.*
- Perennial.
  - Glumes about equal.
    - Awns unequal, less than 8 mm. long; glumes not awned; fruit exserted................ 2. *A. Palmeri.*
    - Awns 12-20 mm. long; glumes short-awned; fruit not exserted.
      - Branches of panicle horizontally spreading.... 3. *A. divaricata.*
      - Branches of panicle ascending or appressed... 4. *A. Parishii.*
  - Glumes strongly unequal, the first much shorter than the second.
    - Neck of fruit jointed; glumes awnless.......... 5. *A. californica.*
    - Neck of fruit not jointed.
      - Glumes short awned; fruit scabrous.......... 6. *A. purpurea.*
      - Glumes awnless; fruit smooth.
        - Panicle many-flowered, narrow, strict...... 7. *A. Reverchoni.*
        - Panicle few-flowered, loose................ 8. *A. Fendleriana.*

1. **A. bromoides** H. B. K. Open grounds in the foothills, Santa Monica Mts.; borders of the Colorado Desert; San Diego.

2. **A. Palmeri** Vasey. Hanson's Mt., San Diego.

3. **A. divaricata** H. & B. Foothills, Santa Monica Mts.; San Jacinto; San Diego, *Orcutt.*

4. **A. Parishii** Hitch. Not infrequent in the Colorado Desert near Palm Springs; San Diego.

5. **A. californica** Thurb. Colorado Desert.

6. **A. purpurea** Nutt. Not uncommon in the chaparral belt from San Bernardino to San Diego.

7. **A. Reverchoni** Vasey. Desert and plains, southern California, *Jepson.*

8. **A. Fendleriana** Steud. Desert and plains, southern California, *Jepson;* San Bernardino Mts., *Parish.*

16. STIPA. Feather Grass.

Tufted perennials with narrow or involute leaves and terminal panicles; spikelets 1-flowered; glumes thin, membranaceous, unequal, acute or bristle-tipped; lemma closely investing the floret, terminating in a simple, stout, geniculate, twisted awn.

Awns long plumose below the bend, the hairs 6-8 mm. long .... 1. *S. speciosa.*
Awns plumose to the apex or nearly so, the hairs short.
  Sheaths glabrous .... 2. *S. occidentalis.*
  Sheaths pubescent .... 3. *S. Elmeri.*
Awns only scabrous or puberulent.
  Lemma densely hairy, hairs 4 mm. long.
    Plant stout over 9 dm. high.................. 4. *S. coronata.*
    Plant slender, less than 6 dm. high............ 5. *S. Parishii.*
  Lemma more or less hairy, hairs 1 mm. long or less.
    Panicles loose, the branches spreading.
      Awns 5-7.5 cm. long; glumes purplish......... 6. *S. pulchra*
      Awns 2.5-3 cm. long....................... 7. *S. eminens.*
    Panicles narrow, branches erect, awns with 2 bends.
      Sheaths hairy at the throat.
        Glumes thin, shining, obscurely nerved.... 8. *S. californica.*
        Glumes firm, 5-7 nerved.................. 9. *S. Vaseyi.*
      Sheaths not hairy at the throat; glumes 3-nerved.
        Glumes broad, 6 mm. long................. 10. *S. Lemmoni.*
        Glumes narrow, acuminate, 4 mm. long.... 11. *S. Lettermani.*

1. **S. speciosa** T. & R. Common in the Colorado and Mohave Deserts, less so on arid interior plains.

2. **S. occidentalis** Thurb. Mt. Wilson, *Abrams.*

Var. *Montana* Merrill & Davy. Awn wholly pilose. Mt. Tahquitz, type locality, *Hall;* Ontario Peak, *Johnston.*

3. **S. Elmeri** Piper & Brodie. Mill Creek Falls, San Bernardino Mts., *Parish;* North side Mt. Tahquitz, *Hall.*

4. **S. coronata** Thurb. Dry flats in the foothills from San Bernardino to San Diego.

5. **S. Parishii** Vasey. Occasional in the Upper Transition Zone, Riverside Co. to San Diego Co.

6. **S. pulchra** Hitch. Common on adobe banks on plain and foothill from Los Angeles to San Diego in the coast ranges.

7. **S. eminens** Cav. Frequent in the chaparral zone from San Bernardino to San Diego.

Var. *Andersoni* Vasey. A smaller plant with involute blades and few flowers. Ranging with the type.

8. **S. californica** Merrill & Davy. Fuller's Ridge, San Jacinto Mts., type locality.

9. **S. Vaseyi** Scrib. San Nicholas Island, *Jepson;* Chalk Hill, San Jacinto, *Hall.*

10. **S. Lemmoni** Scrib. Mountains, San Diego Co.

11. **S. Lettermani** Vasey. Dry hillsides, Bear Valley, *Parish.*

17. ORYZOPSIS.

Slender perennials with loosely flowered panicles; spikelets 1-flowered; glumes nearly equal; lemma broad, shorter than the glumes, terminating in a slender deciduous awn.

Lemmas covered with silky hairs, 3 mm. long........ 1. *O. hymenoides.*
Lemmas smooth .... 2. *O. miliacea.*

1. **O. hymenoides** Ricker. (Eriocoma cuspidata Nutt.) Colorado and Mohave Deserts and on arid plains in the interior.

2. **O. miliacea** B. & H. An occasional escape, Los Angeles; Santa Barbara, *Grant.*

18. MUHLENBERGIA.

Perennial or rarely annual with narrow spike-like or open and widely spreading inflorescence; spikelets 1-flowered; glumes usually unequal, membranaceous or hyaline, 1-nerved; lemma narrow, 3-nerved, acute or awned from the tip or between the teeth of the bidentate apex; awn straight or flexuous.

Lemma awned, awns 6 mm. long or more.
  Panicles narrow, spike-like.
    Hairs at base of floret as long as body of lemma. 1. *M. comata.*
    Hairs at base of lemma one-half as long as body of lemma....................... 2. *M. Lemmoni.*
  Panicle erect, loose; plant purplish.............. 3. *M. microsperma.*
  Panicle open and spreading.................... 4. *M. Porteri.*

Lemmas awned, awns 2 or 3 mm. long, hairy at base; pannicles spike-like.............. 5. *M. californica.*
Lemma acute, awnless; panicles spike-like.
  Plants lax, blades flat......................... 6. *M. filiformis.*
  Plants decumbent, stiff, leaves wiry............ 7. *M. squarrosa.*

1. **M. comata** Thurb. San Bernardino Mts., *Abrams.*

2. **M. Lemmoni** Scribn. Deserts from southern California to Texas, *Jepson.*

3. **M. microsperma** Trin. Dry hillsides, Los Angeles; Orange and San Diego Co's, not common.

4. **M. Porteri** Scribn. San Felipe, San Diego Co., *Parish.*

5. **M. californica** Vasey. Rialto; Cold Creek, San Bernardino Mts.; Lytle Creek, *Johnston;* San Diego.

6. **M. filiformis** Rydb. Damp meadows, San Bernardino and San Jacinto Mts.

7. **M. squarrosa** Rydb. Dry ground in the high mountains, San Jacinto to the summit; upper San Antonio Canyon, *Johnston.*

19. PHLEUM. TIMOTHY.

Erect perennials with flat leaves and cylindrical terminal heads; spikelets 1-flowered; glumes ciliate on the keel, awn pointed; lemma 5-nerved.

Head elongate-cylindrical; awns 1 mm. long........ 1. *P. pratense.*
Head short ovoid or oblong; awns 2 mm. long....... 2. *P. alpinum.*

1. **P. pratense** L. Roadsides and lawns, an escape from cultivation.

2. **P. alpinum** L. Abundant in wet meadows Tahquitz Valley, *Hall.*

20. ALOPECURUS. FOXTAIL.

Annual or perennial with erect or decumbent culms, flat leaves and densely flowered cylindrical, spike-like, terminal panicles; spikelets 1-flowered; glumes equal, awnless, more or less ciliate, usually connate at base; palea none.

Panicle 6 mm. wide.
  Spikelets 4-6 mm. long.......................... 1. *A. pratensis.*
  Spikelets 3 mm. long............................ 2. *A. californicus.*
Panicle 4 mm. wide.
  Plant erect; lemma shorter than the glume; awn scarcely exserted .... 3. *A. aristulatus.*
  Plant decumbent; awn slightly exserted.......... 4. *A. geniculatus.*

1. **A. pratensis** L. Occasional escape on waysides. Native of Europe.

2. **A. californicus** Vasey. Meadows and wet places along the coast to San Diego, *Jepson's* Fl. Cal.

3. **A. aristulatus** Michx. Damp meadows, Bear Valley.

4. **A. geniculatus** L. Moist flats, Sunnyside, Los Angeles; San Diego, *Abrams*.

21. SPOROBOLUS. Dropseed Grass.

Perennials with tufted or creeping roostocks, flat or involute leaves and diffuse panicles with small spikelets; spikelets 1-flowered; glumes awnless, usually unequal; lemma awnless; palea equalling or exceeding the lemma.

Glumes unequal, one of them as long as the spikelet; plants caespitose; leaves involute....... 1. *S. airoides.*
Glumes nearly equal, shorter than the spikelets; plant decumbent; leaves flat............ 2. S. *asperifolius.*

1. **S. airoides** Torr. Frequent in the Colorado and Mohave Deserts and occasionally in the interior valleys.

2. **S. asperifolius** N. & M. Riverside; northern Ventura Co., *Jepson.*

22. EPICAMPES.

Tall perennial with a many-flowered, narrow spikelike panicle about 3 dm. long; spikelets 1-flowered; glumes slightly unequal; lemma 3-nerved, mucronate or short-awned.

1. **E. rigens** Benth. Frequent both in the foothills and mountains up to 1,800 meters, from Santa Barbara to San Diego.

23. POLYPOGON. Beard-grass.

Annuals or perennials with flat leaves and densely flowered, bristly, terminal panicles; spikelets 1-flowered; glumes equal, awned; lemmas much shorter than the glumes, short awned.

Annual; glumes notched at the apex; awns 7-10 mm. long .... 1. *P. monspeliensis.*
Perennial; glumes attenuate; awns 1-3 mm. long. 2. *P. littoralis.*

1. **P. monspeliensis** Desf. Common and widely distributed along streams on plains and mountains. Native of Europe.

2. **P. littoralis** Smith. Occasional along streams. Native of Europe.

24. AGROSTIS. Bentgrass.

Annuals or usually perennials with open panicles and small spikelets; spikelets 1-flowered; glumes subequal, longer than the floret; lemma awnless or awned from the back; palea small, minute or wanting.

Panicle narrow or contracted.
  Culms decumbent at the base; panicle lobed or verticillate; palea one-half the length of the lemma, lemma awnless............. 1. *A. stolonifera.*
  Culms erect; panicle narrow or spike-like.
    Lemma with an exserted awn.................. 5. *A. microphylla.*
    Lemma awnless or with a short included awn.
      Plant tall, panicle 5-25 cm. long............. 6. *A. exarata.*
      Plant dwarf, panicle 2.5-5 cm. long.......... 7. *A. Rossae.*
Panicles loose and spreading.
  Palea one-half the length of the lemma.......... 2. *A. alba.*
Palea wanting.
    Plants spreading by rhizomes.
      Lemma awnless with a tuft of hairs at base... 3. *A. Hallii.*
      Lemma awnless, tuft of hairs wanting........ 4. *A. foliosa.*
    Plants not producing rhizomes.
      Branches of the panicle ascending, 7-10 cm. long .... 8. *A. hiemalis.*
      Branches of the panicle spreading, 4-6 cm. long. 9. *A. idahoensis.*
      Branches of the panicle verticillate, 5-10 cm. long; lemma less than 2 mm. long.....10. *A. schiedeana.*

1. **A. stolonifera** L. Along streams and ditches in the plains and lower chaparral zone. Bear Valley, 1882.

2. **A. alba** L. An escape fairly established on moist roadsides. San Bernardino, 1892.

3. **A. Hallii** Vasey. Santa Barbara.

4. **A. foliosa** Vasey. Occasional in San Diego Co., *Abrams;* San Jacinto Mt., *Hall.*

5. **A. microphylla** Steud. San Diego, *Jepson.*

6. **A. exarata** Trin. Occasional along streams, Bear Valley, *Parish;* San Antonio Canyon, *Johnston.*

7. **A. Rossae** Vasey. Upper Transition Zone., San Antonio Mts., *Johnston.*

8. **A. hiemalis** B. S. P. High mountains of southern California, *Jepson.*

9. **A. idahoensis** Nash. High mountain meadows of the San Bernardino; San Jacinto and San Antonio Mts.

10. **A. schiedeana** Trin. In wet meadows, Bear Valley, *Parish.*

25. GASTRIDIUM.

Erect annual with flat leaves and dense, spike-like, terminal panicles; spikelets 1-flowered; glumes awn pointed; lemma pubescent, shorter than the glumes, awned below the apex.

1. **G. lendigerum** Gaud. Dry ground along the foothills, Los Angeles and Orange Cos. 1892.

26. CALAMAGROSTIS. WATER BENTGRASS.

Tall, reedlike perennials with small spikelets in many flowered panicles; rachilla prolonged above the floret as a hairy pedicel; glumes subequal, usually exceeding the lemma; lemma awned on the back below the middle and surrounded by a tuft of hairs at the base; palea 2-nerved.

Panicle loose 2-4 dm. long........................ 1. *C. aleutica.*
Panicle dense, spikelets interrupted, 5-10 cm. long... 2. *C. densa.*

1. **C. aleutica** Bong. San Pedro, *Jepson.*
2. **C. densa** Vasey. Julian, San Diego Co., *Vasey.*

TRIBE VII. AVENEAE.

Spikelets articulated with the pedicels below the glumes.
  Spikelets awned ....27. NOTHOLCUS.
  Spikelets awnless ....32. SPHENOPHOLIS.
Spikelets articulated above the glumes.
  Awns wanting or but a mucronate tip............33. KOELERIA.
  Awns present.
    Awns from between the teeth of the bidentate apex of the lemma....................30. DANTHONIA.
    Awns dorsal.
      Lemmas more than 12 mm. long.............29. AVENA.
      Lemmas less than 12 mm. long.
        Lemmas keeled; awn from above the middle. 31. TRISETUM.
        Lemmas convex; awn from above the middle. 28. DESCHAMPSIA.

27. NOTHOLCUS.

A grayish, velvety, pubescent perennial with flat leaves and purplish tinged somewhat contracted panicle; spikelets 2-flowered, the lower floret perfect, awnless, the upper staminate, awned; glumes subequal, villous; lemma ciliate at apex; palea nearly as long as the lemma. (*Holcus* L.)

1. **N. lanatus** Nash. Rare and local, Santa Anita; Pasadena; Idyllwild, Riverside Co., 1894.

28. DESCHAMPSIA.

Annuals or perennials with small shining spikelets in terminal or lateral panicles; spikelets mostly 2-flowered; rachilla prolonged beyond the floret as a hairy bristle; glumes scarious, nearly equal; lemma 4-nerved, truncate, 2-4-toothed and awned on the back.

Annual; awns strongly geniculate.
  Glumes 6-8 mm. long........................ 1. *D. danthonioides.*
  Glumes about 4 mm. long.................. 2. *D. gracilis.*
Perennial; awns straight.
  Panicle narrow, branches adpressed; plant slender .... 3. *D. elongata.*
  Panicle loose spreading; plant stout.......... 4. *D. caespitosa.*

1. **D. danthonioides** Munro. Occasional on dry foothill slopes Los Angeles and Orange Co's.; San Bernardino Mts.

2. **D. gracilis** Vasey. Rare, Santa Monica and San Gabriel Foothills; San Diego.

3. **D. elongata** Munro. Forest Home, San Bernardino Mts., *Miss Thekla Mohr;* Big Rock Creek, apparently rare.

4. **D. caespitosa** Beauv. Damp Meadows, Bear Valley.

29. AVENA. Oats.

Annual or perennial with flat leaves and drooping spikelets; spikelets 2-6-flowered; glumes subequal longer than the lemmas; lemmas often bidentate at the apex with a long dorsal twisted awn.

Lemmas glabrous, awn usually wanting; spikelets 2-flowered .... 1. *A. sativa.*
Lemmas clothed with stiff, reddish brown hairs.
  Teeth of lemma acute, not awned; spikelets usually 3-flowered .... 2. *A. fatua.*
  Teeth of lemma with awns, 4 mm. long; usually 2-flowered .... 3. *A. barbata.*

1. **A. sativa** L. Cultivated oats. An escape from cultivation.

2. **A. fatua** L. Wild Oats. An all too common weed in grain fields and wastes.

Var. *glabrata* Peterm. Bastard oats. Resembles the cultivated oat, but the lemma is usually slightly hairy and long awned.

3. **A. barbata** Brot. Widely distributed and the most common species in many localities.

30. DANTHONIA.

Low tufted perennials with simple, narrow panicles of few spikelets; glumes subequal, much longer than the lemma; lemma 2-toothed at the apex, the awn arising from between the teeth, flat and twisted at the base.

Sheaths pubescent .... 1. *D. americana.*
Sheaths glabrous .... 2. *D. californica.*

1. **D. americana** Scrib. Damp ground, Bear Valley.

2. **D. californica** Boland. Dry hillside, Newhall Tunnel.

31. TRISETUM.

Tufted perennials with open or spike-like panicles; spikelets 2-5-flowered rachilla prolonged as a hairy bristle; glumes unequal, the first 1-nerved, the second 3-nerved; lemmas 2-toothed, awned on the back; palea 2-toothed.

Panicle spreading .... 1. *T. cernuum.*
Panicle spike-like .... 2. *T. spicatum.*

1. **T. cernuum** Trin. Strawberry Creek, San Jacinto Mt., *Hall.*

2. **T. spicatum** Richter. Occasional in the San Bernardino Mts., *Parish;* summit of San Jacinto Mt.

32. SPHENOPHOLIS.

Slender perennial with a narrow, compact panicle; spikelets 2-3-flowered; glumes nearly equal, dissimilar; lemma awnless or awned below the summit.

1. **S. obtusata, lobata** Scribn. Santa Ana River; San Bernardino and Palm Springs, *Jepson.*

33. KOELERIA.

Erect tufted perennial with compact, spike-like panicle, 5-10 cm. long; spikelets 2-4-flowered; glumes unequal, the first 1-nerved, the second 3-nerved; lemma acute or awned.

1. **K. cristata** Pers. Common in open woods throughout the mountains. A very variable species of which many varieties have been published.

Tribe VIII. CHLORIDEAE.

Spikes digitate.
  Perennial .... 34. Cynodon.
  Annual.
    Lemma awnless .... 38. Elusine.
    Lemma long-awned .... 36. Chloris.
Spikes racemose.
  Spikelets 1-flowered; lemma awnless.............. 35. Spartina.
  Spikelets 2-4-flowered.
    Spikelets crowded on one side of rachis; lemmas 3-awned .... 37. Bouteloua.
    Spikelets small, scattered; lemmas awned or awnless .... 39. Leptochloa.

34. CYNODON. Bermuda Grass.

Low perennials, from running rootstocks, with short flat leaves and slender digitate unilateral spikes; spikelets 1-flowered, sessile in 2 rows along one side of the rachis; glumes unequal;

lemma ciliate on the keel; palea a little shorter than the lemma.

1. **C. dactylon** Pers. Common along roadsides and a usurper in lawns. San Bernardino, 1880.

35. SPARTINA. MAT-GRASS.

A stout perennial marsh grass with long, horizontal rootstocks, long glabrous leaves and an inflorescence of unilateral spikes; glumes unequal, acute, ciliate on the keel; lemma shorter than the second glume; palea longer than the lemma.

1. **S. foliosa** Trin. Marshes along the coast from Long Beach to San Diego.

36. CHLORIS.

Perennial with flat leaves and a showy inflorescence of digitate spikes; spikelets 1-flowered, sessile in 2 rows on one side of a continuous rachis; glumes unequal, acute; lemma 3-nerved, short hairy below; awns straight, 10 mm. long.

1. **C. elegans** H. B. K. Common in the bottom lands of the Colorado River since 1860, *Thurber;* occasional at Riverside and Pomona.

37. BOUTELOUA. GRAMA GRASS.

Low annuals or perennials with few or many unilateral spikelets nearly sessile along a common rachis; spikelets 1-2-flowered, sessile in 2 rows along one side of a flat rachis that usually projects beyond the spikelets; glumes unequal, keeled; lemma 3-nerved, 2-4-toothed or cleft, usually awned between the teeth; sterile floret sometimes reduced to awns.

Spikes numerous; spikelets 1-3.	
Awns very short; plant perennial	1. *B. curtipendula.*
Awns conspicuous; plant annual	2. *B. aristidoides.*
Spikes few; spikelets numerous.	
Annual.	
Spikes 2-4; awns about 3 mm. long	3. *B. arenosa.*
Spikes 4-6; one sided; awns 3 mm. long	4. *B. barbata.*
Perennial.	
Spikes 6 or more.	
Spikes narrow, one sided; spikelets numerous.	5. *B. Rothrockii.*
Spikes broad, irregularly one sided; spikelets 3-6	6. *B. radicosa.*
Spikes 1-6	
Glumes stiff-hairy.	
Spikes 3-5; rachis extended much beyond the spikelet	7. *B. hirsuta.*
Spikes 1-3; rachis slightly extended	8. *B. gracilis.*

1. **B. curtipendula** Torr. San Jacinto Range, *Hall.*
2. **B. aristidoides** Griseb. Colorado Desert.

3. **B. arenosa** Vasey. Cargo Muchacho, Colorado Desert, *Jepson.*

4. **B. barbata** Lag. Palm Springs and the Colorado Desert.

5. **B. Rothrockii** Vasey. Southern San Diego Co.

6. **B. radicosa** Griff. San Diego Co., *Jepson.*

7. **B. hirsuta** Lag. Mesas, San Diego Co., *Jepson.*

8. **B. gracilis** Lag. Bear Valley; Santa Ana Canyon, *Hall;* Jamacha, *Jepson.*

38. ELEUSINE.

Tufted annual with flat leaves and digitate spikes; spikelets several flowered, sessile and imbricated in 2 rows on one side of a continuous rachis; glumes unequal; lemma 5-ribbed.

1. **E. indica** Gaertn. Occasional on street borders, Los Angeles, 1907.

39. LEPTOCHLOA.

Rather tall annuals with flat leaves and elongated simple panicles of slender spikes; spikelets 2-several flowered, alternating in 2 rows on one side of the rachis; glumes keeled, 1-nerved; lemma keeled, awned or awnless.

Sheaths hairy .... 1. *L. filiformis.*
Sheaths smooth .... 2. *L. imbricata.*

1. **L. filiformis** Beauv. Muddy roadsides, Santa Ana; Ballona; Imperial Co.

2. **L. imbricata** Thurb. Ditches and moist ground San Bernardino Mts., Salton Sea to Colorado River, *Jepson.* Los Angeles River and streets of Los Angeles.

Tribe IX. FESTUCEAE.

Spikelets of 2 kinds in same inflorescence, perfect and sterile.
  Lemma long-awned .... 49. Lamarckia.
Spikelets all alike in the same inflorescence.
  Plants dioecious.
    Spikelets solitary, concealed in the axils of the crowded short rigid leaves............. 40. Monanthochloe.
    Spikelets in exserted, spike-like panicles........ 47. Distichlis.
  Plants not dioecious.
    Hairs on the rachilla or lemma very long, exceeding the lemma in length; tall reeds.
      Rachilla hairy; lemma naked................. 42. Phragmites.
      Rachilla naked; lemma hairy.................. 41. Arundo.

Hairs, if any, on the rachilla and lemma shorter than the lemma.

Lemma 3-nerved.

Lemma bidentate, usually awned; nerves pilose .... 43. Tridens.

Lemma awnless, pubescent.

Glumes equalling or exceeding spikelet.... 44. Dissanthelium.

Glumes shorter than the first floret....... 45. Eragrostis.

Lemma 5 to many-nerved.

Spikelets nearly sessile in dense one-sided clusters in an interrupted panicle....... 48. Dactylis.

Spikelets not in dense one-sided clusters.

Lemma keeled, awnless.................. 50. Poa.

Lemma convex or keeled only at the summit.

Glumes large, scarious-margined and papery .... 46. Melica.

Glumes not scarious-margined.

Lemmas acute, pointed or awned at apex .... 53. Festuca.

Lemma bifid at apex, the awn if present arising between the teeth....... 54. Bromus.

Lemma obtuse, distinctly 5-7-nerved; styles present .... 51. Glyceria.

Lemma obtuse, obscurely 5-7-nerved; styles none .... 52. Puccinellia.

40. MONANTHOCHLOE.

A creeping stoloniferous perennial with wiry stems and short, rigid leaves; spikelets 2-3 flowered, concealed within the leaf-fascicles, the upper floral leaves becoming smaller, at length reduced to sheaths resembling glumes; lemmas obtuse or denticulate.

1. **M. littoralis** Engl. Occasional on the borders of salt marshes, from Santa Barbara to San Diego.

41. ARUNDO. Giant Reed.

Reed-like perennial, 2-3 meters tall, with flat leaves and ample terminal panicles; spikelets 3-4-flowered; glumes narrow, subequal, 3-nerved, about as long as the spikelet; lemma 3-nerved, 2-toothed at the apex, mucronate between the teeth, long pilose on the back.

1. **A. donax** L. Occasional escape along Los Angeles River. 1889.

42. PHRAGMITES. Common Reed.

Tall reed-like perennial with large terminal panicles; spikelets loosely 3-7-flowered; rachilla clothed with long silky hairs; lemmas very narrow, acuminate.

1. **P. communis** Trin. San Bernardino, *Parish.*

43. TRIDENS.

Perennials with open or spike-like inflorescence; glumes glabrous, acuminate; lemma 5-nerved, entire or 2-toothed, the mid-nerve excurrent forming an awn, pilose; palea ciliate on the nerves.

1. **T. pulchellus** Hitch. Dry hills, Mohave and Colorado Deserts.

44. DISSANTHELIUM.

Annual with flat leaves an narrow loose panicles; glumes unequal, exceeding the spikelet, the first 1-nerved the second 3-nerved; lemma awnless, 3-nerved.

1. **D. californicum** Benth. San Clemente Island.

45. ERAGROSTIS.

Annuals or perennials with simple or branched culms; spikelets 3 to many flowered; glumes much shorter than the spikelets; lemmas 3-nerved; palea shorter than the lemma.

Perennial.
  Panicle narrow, spikelets crowded on very short branches .... 1. *E. secundiflora.*
  Panicle open, the branches rather rigid........... 2. *E. lugens.*
Annual.
  Spikelets broad, more than 2 mm. wide.......... 3. *E. megastachya.*
  Spikelets narrow, 1-5 mm. wide or less.
    Panicle glabrous in lower axils.
      Pedicels ascending; lower lemmas less than 0.5 mm. wide......................... 4. *E. mexicana.*
      Pedicels spreading; lower lemmas 0.5 mm. wide. 5. *E. Orcuttiana.*
    Panicle pilose in the lower axils.
      Lower lemmas 0.5 mm. wide................. 6. *E. limbata.*
      Lower lemmas less than 0.5 mm. wide........ 7. *E. pilosa.*
  Spikelets dioecious; culms extensively creeping.... 8. *E. hypnoides.*

1. **E. secundiflora** Presl. Colorado Desert; San Diego, *Jepson.*

2. **E. lugens** Nees. Sandy prairies, San Diego Co., *Jepson.*

3. **E. megastachya** Link. Occasional in sandy ground.

4. **E. mexicana** Link. A weed in fields and wastes, southern California, *Jepson.* Santa Ana, 1882.

5. **E. Orcuttiana** Vasey. Pomona; near Redlands; type from Chollas Valley, San Diego, *Vasey*.

6. **E. limbata** Fourn. Mesas, San Diego Co., *Jepson*.

7. **E. pilosa** Beauv. Occasional along roadsides and fields, Los Angeles; San Bernardino and Orange Co's.

8. **E. hypnoides** B. S. P. Los Angeles, 1904.

46. MELICA. Melic-grass.

Perennials, sometimes bulbous at base with simple raceme-like or open inflorescence; spikelets 2 to several flowered; glumes unequal, broad and papery, awnless, 3-5-nerved; lemmas large, 7-nerved, scarious-margined, awnless or short-awned.

Spikelets 10 mm. or more long with 3 or 4 fertile florets.
  Spikelets reflexed .... 1. *M. stricta.*
  Spikelets not reflexed.
    Glumes silvery shining, equalling the spikelet... 2. *M. frutescens.*
    Glumes purplish, shorter than the spikelet....... 3. *M. bulbosa.*
Spikelets 4-6 mm. long with 1 or 2 fertile florets.... 4. *M. imperfecta.*

1. **M. stricta** Boland. Frequent on the north slope of the San Antonio and San Gabriel Mts.; occasional in Bear Valley.

2. **M. frutescens** Scribn. Riverside; San Jacinto; San Diego Co., type locality, *Jepson*.

3. **M. bulbosa** Ventura Co., *Jepson;* frequent in the Tehachapi Mts.

4. **M. imperfecta** Trin. Common on foothill and canyon slopes.

Var. *refracta* Thurb. Lower branches reflexed, blades pubescent. Transition Zone Los Angeles Co.; Waterman Canyon, *Parish*.

Var. *flexuosa* Boland. Blades glabrous; lower branches spreading or reflexed. Occasional from Santa Barbara to San Diego.

Var. *minor* Scribn. Widely distributed from Santa Barbara to San Diego and from the Channel Islands to the desert; *Edgar Canon,* San Bernardino Mts., type-station; not common.

47. DISTICHLIS. Spike-grass.

Rigid erect perennial with long creeping rootstock and dense panicles; spikelets many flowered, strongly compressed; glumes unequal, keeled; lemmas coriaceous.

1. **D. spicata** Greene. Common in subalkaline places, especially near the coast; Mohave Desert.

48. DACTYLIS. Orchard Grass.

Perennial grass with flat leaves and paniculate inflorescence; spikelets 3-5-flowered, nearly sessile; glumes unequal, the first 1-nerved, the second 3-nerved, awn-pointed, the keel ciliate.

1. **D. glomerata** L. Occasional escape from cultivation. San Bernardino, 1886.

49. LAMARCKIA. Golden-top.

Low annual with yellow or purplish one-sided showy panicles: spikelets of two forms, the fertile ones almost hidden by the numerous sterile ones; glumes acuminate or short-awned; lemmas slender awned.

1. **L. aurea** Moench. A now well established plant. Mill Creek, San Bernardino Co. 1875.

50. POA.

Annual or perennial grasses with flat or convolute leaves and contracted or open panicles; spikelets 2 or more flowered, glumes 1-3-nerved; lemmas awnless, 5-nerved, the nerves sometimes villous.

Annual.
  Lemmas villous on nerves below.
    Low plant; panicle with spreading branches; spikelets 4 mm. long.................. 1. *P. annua.*
    Taller plant; panicle narrow with adpressed branches; spikelets 6 mm. long......... 2. *P. Bigelovii.*
  Lemmas not villous; panicles open with few stiff branches .... 3. *P. Bolanderi.*
Perennial.
  Lemmas webbed at base.
    Stems compressed; panicles narrow............ 4. *P. compressa.*
    Stems not compressed; panicles open........... 5. *P. pratensis.*
  Lemmas not webbed at base.
    Panicles open; glumes 4 mm. long............ 6. *P. Olneyae.*
    Panicles purplish, dense, spikelike............. 7. *P. atropurpurea.*
  Lemmas villous on keel and marginal nerves.
    Ligule less than 1 mm. long................... 8. *P. Fendleriana.*
    Ligule 5-7 mm. long.......................... 9. P. *longiligula.*
  Lemmas pubescent below.
    Leaves filiform; panicle spike-like.............10. *P. nudata.*
    Leaves flat and narrow; panicle narrow.
      Sheaths scabrous ....11. *P. scabrella.*
      Sheaths smooth ....12. *P. Sandbergii.*
  Lemmas smooth; panicle narrow; sheaths scabrous.13. *P. nevadensis.*

1. **P. annua** L. Common along roadsides and in wastes. Native of Europe.

2. **P. Bigelovii** Vasey & Scribn. Palm Springs and borders of the Colorado Desert; Big Rock Creek; Laguna Mts., rather rare.

3. **P. Bolanderi** Vasey. Bear Valley; San Jacinto Mts.

4. **P. compressa** L. Canada Bluegrass. Occasional along streets in Los Angeles. 1918.

5. **P. pratensis** L. Kentucky Bluegrass. An escape from cultivation near towns; native in the San Bernardino Mts.

6. **P. Olneyae** Piper. Griffin, Ventura Co.; San Jacinto Mts., *Jepson.*

7. **P. atropurpurea** Scribn. Dry hillsides Bear Valley, only location.

8. **P. Fendleriana** Vasey. Common in open foothills; occasional in the mountains.

9. **P. longiligula** Scribn. & Williams. Greyback Mt.; Mill Creek Falls. *Parish.*

10. **P. nudata** Scribn. Portero, San Diego Co., type locality.

11. **P. scabrella** Benth. Occasional in the mountains from Santa Barbara to the San Gabriel Mts.

12. **P. Sandbergii** Vasey. Ventura and San Diego Co's., *Jepson.*

13. **P. nevadensis** Vasey. Mohave Desert, *Jepson;* Bear Valley, *Parish.*

51. GLYCERIA. Manna Grass.

Tall aquatic perennial with flat, scabrous leaves and large diffuse panicles; spikelets 3-5 mm. long, 6-8-flowered; glumes unequal, shorter than the lemma; lemmas prominently 7-nerved, awnless.

1. **G. elata** Hitchc. Wet meadows, San Jacinto Mts., 2,000 meters, *Hall.*

52. PUCCINELLIA.

Tufted perennial with involute leaves and open panicle spikelets as in Glyceria, but with smaller obscurely nerved lemmas.

1. **P. Nuttalliana** Hitchc. Subalkaline flats at Santa Ana, Alamitos and Hynes; Bear Valley, *Parish;* Simi, Ventura Co.

53. FESTUCA. Fescue.

Annuals or perennials with dense, loose or spreading panicles; spikelets 2 to several flowered; glumes narrow, more or less unequal; lemmas acute or tapering into a straight awn, faintly 3-5-nerved.

Spikelets densely 5-13-flowered; lemmas without scarious margin. .... 1. *F. octoflora.*

Spikelets loosely 1-5-flowered; lemmas with narrow scarious margin.

Branches of the panicle, or at least some of them, divergent.

Florets mostly 3-5 in a spikelet, only the principal branches divergent.

Lemmas glabrous.

Glumes glabrous .... 2. *F. pacifica.*

Lemmas hirsute.

Glumes glabrous .... 3. *F. eriolepis.*

Glumes hirsute .... 4. *F. Grayi.*

Florets mostly 1-3 in each spikelet, all the spikelets divergent.

Lemmas glabrous .... 5. *F. reflexa.*

Lemmas pubescent.

Glumes glabrous .... 6. *F. microstachys.*

Branches of the panicle erect or adpressed.

Lower glume ⅔-¾ as long as the upper........ 7. *F. bromoides.*

Lower glume not more than ½ as long as the upper.

Lemma ciliate .... 8. *F. megalura.*

Lemma not ciliate .... 9. *F. myuros.*

Perennial.

Lemmas awnless; plants tall.

Panicle narrow, branches adpressed............ 10. *F. confinis.*

Panicle contracted, branches spreading.......... 11. *F. elatior.*

Lemmas awned.

Auricles pilose; sheaths puberulent............ 12. *F. Parishii.*

Auricles not pilose; sheaths smooth.

Plant 4-6 dm. high; spikelets usually purple tinged .... 13. *F. rubra.*

Plant 10-15 cm. high.......................... 14. *F. supina.*

1. **F. octoflora** Walt. Frequent throughout the chaparral belt and in the mountains.

Var. *hirtella* Piper. Plant low and tufted, foliage pubescent. The common form in the foothills.

2. **F. pacifica** Piper. Open grounds throughout the state, *Jepson.*

3. **F. eriolepis** Desv. Dry slopes in the chaparral zone, San Bernardino Mts., *Parish.*

4. **F. Grayi** Piper. Sandy ground, Cuyamaca Mts., and mountains of Ventura Co., *Abrams.*

5. **F. reflexa** Buckl. Common on foothill and mesas.

6. **F. microstachys** Nutt. Occasional in the San Gabriel Mts.; frequent in the San Bernardino Mts.

7. **F. bromoides** L. An introduced grass in Santa Barbara and San Bernardino Co's., *Jepson.*

8. **F. megalura** Nutt. Common on grassy hillsides and city streets.

9. **F. myuros** L. An occasional casual. San Bernardino, 1882.

10. **F. confinis** Vasey. San Gorgonio Mt., Coon Creek, San Bernardino Mts., *Hall.*

11. **F. elatior** L. Meadow Fescue. Occasional in lawns and borders, Los Angeles. 1892.

12. **F. Parishii** Hitch. Occasional in the Upper Transition Zone, San Bernardino Mts., type locality.

13. **F. rubra** L. San Bernardino Mts., *Jepson.*

14. **F. supina** Schur. San Gorgonio Mt., *Jepson.*

54. BROMUS. Brome Grass.

Mostly introduced annuals and native perennials with flat leaves and rather large spikelets; spikelets terete or flattened, usually many-flowered; glumes unequal; lemmas convex or sharply keeled; 5-9-nerved, awned, rarely awnless, awns usually straight.

- Annual.
  - Awns twisted and bent........................ 1. *B. Trinii.*
  - Awns straight.
    - Panicle contracted and dense.
      - Awns 15 mm. or more long.
        - Stem pubescent below panicle............... 2. *B. rubens.*
        - Stem smooth .... 3. *B. madritensis.*
      - Awn 6-8 mm. long........................ 4. *B. hordeaceus.*
    - Panicle open, the branches spreading.
      - Sheaths pubescent.
        - Awn 30-50 cm. long...................... 5. *B. villosus.*
        - Awn 6-15 mm. long.
          - First glume 1-nerved................. 6. *B. tectorum.*
          - First glume 3-nerved.
            - Glumes densely pilose, the second 7-nerved .... 7. *B. arenarius.*
            - Glumes scabrous-pubescent, the second 5-nerved .... 8. *B. carinatus.*
        - Awn less than 6 mm. long; lemmas glabrous. 9. *B. commutatus.*

Awn 2 mm. long or wanting..............10. *B. unioloides.*
Sheaths smooth; lemmas glabrous............11. *B. secalinus.*
Perennial; awns 3-8 mm. long.
Spikelets subterete.
Branches of panicle stiffly divaricate, blades short.12. *B. Orcuttianus.*
Branches drooping, blades elongated.
Lemmas pubescent throughout...............13. *B. grandis.*
Lemmas pubescent at margins or base only.
Lower glume 3-nerved; lemma densely pubescent ....14. *B. laevipes.*
Lower glume 1-nerved; lemma sparsely pubescent ....15. *B. vulgaris.*
Spikelets strongly flattened.
Leaves narrow, densely pilose..................16. *B. subvelutinus.*
Leaves broad, sparsely pilose..................17. *B. marginatus*

1. B. **Trinii** Desv. Occasional in the foothills, more frequent in the interior dry regions.

2. **B. rubens** L. Fairly common in sandy wastes. San Bernardino. 1886.

3. **B. madritensis** L. Santiago Peak Trail, *Abrams.* Fort Tejon. 1887.

4. **B. hordeaceus** L. (B. mollis L.) Not uncommon along roadsides. Santa Monica. 1890.

5. **B. villosus gussonei** Asch & Graebn. Very common Waterman Canyon. 1895.

6. **B. tectorum** L. Very rare, Alvarado St., Los Angeles; Forest Home, San Bernardino Mts., *Miss T. Mohr,* 1917.

7. **B. arenarius** Labill. Abundantly naturalized at Upland, *Johnston;* Pine Flat, Waterman Canyon, *Parish.* 1905.

8. **B. carinatus** H. & A. Very common on streets and city wastes.

Var. *californicus* Shear. Occasional in the San Gabriel and San Bernardino Mts.

9. **B. commutatus** Schrad. Orange and Redlands; San Bernardino. 1891.

10. **B. unioloides** H. B. K. City streets, San Bernardino and Los Angeles, not yet common. Native of Mexico.

11. **B. secalinus** L. Banks of Los Angeles River, rare. 1893.

12. B. **Orcuttianus** Vasey. Occasional in the San Gabriel and San Bernardino Mts., *Abrams;* Catalina Island; San Diego, type locality.

Var. *Hallii* Hitchc. San Bernardino and San Jacinto Mts.; Prairie Fork, San Antonio Mts., *Johnston.*

13. **B. grandis** Hitch. Frequent in the Transition Zone in all our mountains.

14. **B. laevipes** Shear. Frequent on wooded slopes in the foothills of all our mountains.

15. **B. vulgaris** Shear. San Bernardino Mts., *Jepson.*

16. **B. subvelutinus** Shear. Mountains of Los Angeles, Ventura and San Bernardino Co's., not common.

17. **B. marginatus** Nees. Frequent in the pine belt in all the mountains.

TRIBE X. HORDEAE.

Spikelets usually single at the nodes of the rachis.
  Glumes one; spikelets placed edgewise on the rachis.
    Spikelets several-flowered ....55. LOLIUM.
    Spikelets 1-flowered ....56. MONERMA.
  Glumes 2; spikelets placed flatwise on the rachis.
    Spikelets several-flowered ....58. AGROPYRON.
    Spikelets 1-flowered ....57. LEPTURUS.
Spikelets 2-6 at each joint of the rachis.
  Spikelets 1-flowered, 3 at each joint of the rachis..59. HORDEUM.
  Spikelets 2 to many-flowered.
    Rachis of spike readily breaking into joints.....60. SITANION.
    Rachis continuous, not breaking into joints......61. ELYMUS.

55. LOLIUM. RYE-GRASS.

Annuals or perennials with flat leaves and narrow terminal spikes; spikelets several-flowered, solitary at each node of the rachis; glumes single, rigid, 5-7-nerved; lemmas awned or awnless. All introduced from Europe.

Annual; glume equalling or exceeding spikelet...... 1. *L. temulentum.*
Perennial; glume shorter than the spikelet.
  Flowers 10-20; lemma usually awned............. 2. *L. multiflorum.*
  Flowers 8-10; lemma usually awnless............. 3. *L. perenne.*

1. **L. temulentum** L. Darnel. Occasional along roadsides and fields.

Var. *Arvense* With. Awns short or wanting. With the last.

2. **L. multiflorum** Lam. Italian Rye-grass. Very abundant in cienegas and wet grounds near the coast.

3. **L. perenne** L. English Rye-grass. An escape from cultivation.

56. MONERMA.

Tufted annual with a cylindrical spike; spikelet 1-flowered embedded in the notches of the rachis; glume solitary; lemmas shorter than the glume.

1. **M. cylindrica** C. & D. Occasional on borders of salt marshes from San Pedro to San Diego. Oceanside, 1897.

57. LEPTURUS.

Low annual with slender spikes; spikelets 1-2-flowered, embedded in the joints of the rachis; glumes 2, 5-nerved; lemmas much smaller than the glumes.

1. **L. incurvatus** Trim. Established on the borders of salt marshes in a few places along the coast from Santa Barbara to San Diego. 1902.

58. AGROPYRON. Wheat-grass.

Perennials with flat or involute leaves and terminal spikes; spikelets several-flowered, solitary, sessile; glumes equal, acute or awned; lemmas 5-7-nerved, acute or awned.

- Lemmas long awned.
  - Awns 15-25 mm. long; glumes unawned, obtuse... 1. *A. laeve.*
  - Awns 8-10 mm. long; glumes awned.............. 2. *A. caninum.*
- Lemmas short-awned or awn-pointed.
  - Nodes pubescent .... 4. *A. tenerum.*
  - Nodes smooth .... 3. *A. Parishii.*

1. **A. laeve** Hitchc. Ballona Creek; Santa Ana, San Bernardino and Cuyamaca Mts., the latter the type station, *Abrams.*

2. **A. caninum** Beauv. Upper San Antonio Canyon, *Johnton;* Thomas Valley, San Jacinto, *Hall.*

3. **A. Parishii** Scrib. & Smith. Waterman Canyon, *Parish;* type locality.

4. **A. tenerum** Vasey. Dark Canyon, San Jacinto Mt., *Hall;* Upper Transition Zone, San Antonio Mts., *Johnston.*

59. HORDEUM. Wild Barley.

Annuals or perennials with scabrous leaves and terminal spikes; spikelets 1-flowered, usually in 3's at each joint of the rachis, the lateral generally short stalked and imperfect; glumes equal, subulate; lemma 5-nerved, awned.

Annual.
Awns 25 mm. long; glumes some of them ciliate.. 1. *H. murinum.*
Awns 15 mm. long or less.
Glumes of fertile spikelet dilated above the base.. 2. *H. pusillum.*
Glumes not dilated.
Glumes very scabrous...................... 3. *H. nodosum.*
Glumes glabrous or minutely scabrous........ 4. *H. gussoneanum.*
Perennial; awns 25-50 mm. long.................... 5. *H. jubatum.*

1. **H. murinum** L. A common weed in wastes and pastures. Native of Europe.

2. **H. pusillum** Nutt. In subsaline soils near the coast from Los Angeles to San Diego.

3. **H. nodosum** L. Frequent in the valleys of the foothills. native of Europe.

4. **H. gussoneanum** Parl. Occasional along the coast marshes. 1894.

5. **H. jubatum** L. San Bernardino Mts., *Parish.*

60. SITANION.

Tufted perennials with bristly, readily disarticulated, terminal spikes; spikelets 2 or 3, usually 2 flowered; glumes entire, bifid or many parted from near the base into bristle-like awns; lemmas long awned.

Glumes cleft into many divisions.................. 1. *S. jubatum.*
Glumes entire or 2-cleft or 2-parted.
Glumes, or some of them, 3-nerved.............. 2. *S. Hanseni.*
Glumes 2-nerved.
Glumes entire .... 3. *S. californicum.*
Glumes, or some of them, bifid.
Awns 2.5 cm. long; sheaths usually puberulent .... 4. *S. minus.*
Awns 3.5-5 cm. long; sheaths glabrous...... 5. *S. glabrum.*

1. **S. jubatum** Smith. Common on dry mesas and hillsides, Being very variable as to length of awns and character of pubescence; this species has been described under many names.

2. **S. Hanseni** Smith. Pasadena; Temescal Mts., *Abrams.*

3. **S. californicum** Smith. San Bernardino Mts., type locality; very common in Inyo Co.

4. **S. minus** Smith. Tops of the highest mountains of Riverside; San Bernardino and Los Angeles Co's.

5. **S. glabrum** Smith. Antelope Valley; Mt. Pinos, *Hall;* San Jacinto and Cuyamaca Mts.; Baldy Lookout, *Johnston.*

61. ELYMUS. Wild Rye.

Coarse perennials with flat leaves and closely flowered terminal spikes, spikelets 2-6-flowered all perfect except the upper florets, sessile, mostly in pairs at each node of the spike; glumes 1-3-nerved, acute or awn pointed and placed nearly side by side in front of the florets; lemmas convex, obscurely 5-nerved, acute or awned; palea 2-keeled.

Lemmas long awned; glumes acuminate or awned... 1. *E. glaucus.*
Lemmas not awned or with very short awns.
  Plant stout, over 9 dm. high.
   Lemmas pubescent with a short awn............ 2. *E. cinereus.*
   Lemmas glabrous, awnless..................... 3. *E. condensatus.*
  Plant slender, less than 3 dm. high; lemmas glabrous, short pointed.................... 4. *E. triticoides.*

1. **E. glaucus** Buckl. Common in open places in the foothills and through the pine belt.

Var. *Jepsoni* Davy. Blades and sheaths pubescent. San Bernardino and San Jacinto Mts.

2. **E. cinereus** S. & M. Lancaster, *Elmer.*

3. **E. condensatus** Presl. Common in canyons and moist places in the plains.

Var. *pubens* Hitch. Sheaths and blades pubescent. Santa Barbara.

4. **E. triticoides** Buckl. Common in bottom lands and subalkaline grounds.

Var. *pubescens* Hitch. Sheaths and blades hirsute-pubescent. Griffin, Ventura Co., type locality.

CYPERACEAE. Sedge Family.

Grass or rushlike herbs; stems usually solid; leaves narrow, with closed sheaths, the whole leaf sometimes reduced to a sheath; flowers perfect or unisexual, arranged in spikelets, one in the axil of each scale, the spikelets solitary or clustered, 1 to many-flowered; perianth of bristles or wanting; stamens 1-3; styles 2-3; fruit a lenticular or trigonous achene.

Flowers perfect.
  Spikelets more or less flattened; scales 2-ranked.
   Perianth none .... 1. Cyperus.
   Perianth of 3-6 bristles....................... 2. Schoenus.
  Spikelets not flattened; scales imbricated spirally in several ranks.
   Base of style deciduous, not dilated.
    Perianth consisting of bristles.............. 3. Scirpus.

Perianth of a single hyaline scale............ 4. HEMICARPHA.
Base of style persistent, enlarged.
Spikelet solitary, terminal bractless........... 5. ELEOCHARIS.
Spikelets in umbels; stems leafy at base; bristles none .... 6. FIMBRISTYLIS.
Spikelets 1-4-flowered, polygamous; stems tall, leafy; bristles none.................... 7. CLADIUM.
Flowers all unisexual in separate spikes............. 8. CAREX.

1. CYPERUS. GALINGALE.

Annual or perennial herbs with basal leaves, triangular stems and flowers in umbels or headlike clusters subtended by leaflike bracts; spikelets flat or cylindric, the glumes deciduous or if persistent falling entire, 2-ranked; flowers perfect, perianth none; stamens 1-3; styles 2-3; achenes without a tubercle.

Styles 2-cleft; scales deciduous from the persistent rachis; achenes lenticular.
Annual.
Scales dark brown; achenes oblong......... 1. *C. melanostachys.*
Scales yellow; achenes ovoid................ 2. *C. bromoides.*
Perennial from a wiry rootstock; achenes plano-convex .... 3. *C. laevigatus.*
Styles 3-cleft; achenes 3-angled.
Spikelets flattened, their scales falling away at maturity from the persistent rachis.
Scales with incurved, setaceous tips......... 4. *C. inflexus.*
Scales destitute of setaceous tips.
Annual; wings of the rachis separating to the base.
Wings persistent on the rachis...... 5. *C. erythrorhizos.*
Wings readily deciduous............... 6. *C. Parishii.*
Perennial; wings wholly adnate to the rachis.
Scales purple brown; styles exserted; achenes linear .... 7. *C. rotundus.*
Scales straw-colored; achenes obovoid... 8. *C. esculentus.*
Scales greenish, the keel serrulate near the apex .... 9. *C. serrulatus.*
Spikelets terete, falling away with the scales attached at maturity.
Spikes oblong, compact; spikelets slender.... 10. *C. speciosus.*
Spikes short, loose and spreading; spikelets broader .... 11. *C. longispicatus.*

1. **C. melanostachys** HB.K. (C. diandrus capitatus Britt.) Common in moist places, along streams in Los Angeles and Orange Cos.; San Bernardino.

2. **C. bromoides** Britt. Cienega near Los Angeles and Playa del Rey.

3. **C. laevigatus** L. Not infrequent along Los Angeles river; San Bernardino; Big Morongo, Colorado Desert, *Parish.*

4. **C. inflexus** Muhl. Widely distributed but nowhere abundant, Laguna, Orange Co.; Lytle Creek; Mojave River, *Parish;* San Juan; San Jacinto Mts.

5. **C. erythrorhizos** Muhl. Alamo and New River and along ditches in the Imperial Valley, *Parish.*

6. **C. Parishii** Britt. Edgar Canyon, San Bernardino Mts.; Rock Creek.

7. **C. rotundus** L. On account of its tuberous roots this is a pest in moist orchards at Upland, *Johnston;* moist lawns and waysides, Hollywood. 1910.

8. **C. esculentus** L. Not infrequent along the river bottoms from Los Angeles to San Bernardino. A doubtful native.

9. **C. serrulatus** Wats. Abundant on the roadside near Bandini, Los Angeles Co. 1918.

10. **C. speciosus** Vahl. Occasional in the neighborhood of Los Angeles; Temescal, *Parish.* An evident introduction.

11. **C. longispicatus** Norton. Abundant at San Bernardino and Elsinore Lake, *Parish.*

2. SCHOENUS.

Herbs with the habit of Cyperus but with the rachis of the fertile flowers prolonged and flexuous, or in the 1-flowered species produced beyond the flower, curved and bearing an empty scale; perianth (in ours) of 2-5 ciliate scales; stamens 3; style 3-cleft; achene 3-angled.

1. **S. nigricans** L. Arrowhead Hot Springs; Lone Pine Canyon, near Cajon Pass, *Parish.*

3. SCIRPUS. Bulrush.

Rush-like annuals or perennials with leafy stems or the leaves reduced to basal sheaths; spikelets terete or somewhat flattened, solitary, spicate or umbellate, with or without an involucre; flowers perfect; perianth of 1-6 bristles, these sometimes barbed or ciliate; stamens 2-3; styles 2-3-cleft, not swollen at the base, wholly deciduous from the achene, or its base persistent as a subulate tip; achene triangular, lenticular or plano-convex.

Spikelet solitary.

Involucre wanting .... 1. *S. pauciflorus.*

Involucre early deciduous; perianth bristles none.. 2. *S. cernuus.*

Spikelets more than 1; involucres persistent.

Stems 3-angled.

Involucral bract 1; inflorescence apparently lateral.

Leaves 2-6, long and narrow.................. 3. *S. americanus.*

Leaves 0-2, short and broad.................. 4. *S. Olneyi.*

Involucral bracts all foliaceous; inflorescence terminal.

Spikelets large, few in umbel.

Achenes plano-convex, dark................ 5. *S. paludosus.*

Achenes obovate, cuneate at base........... 6. *S. campestris.*

Spikelets small, many, in compound umbel; bristles 4 .... 7. *S. microcarpus.*

Stems terete or very obtusely 3-angled.

Umbels of a few short rays; bristles equalling or exceeding achenes, barbed.......... 8. *S. acutus.*

Umbels decompound, long rayed; bristles shorter than achene, plumose .... 9. *S. californicus.*

1. **S. pauciflorus** Lightf. Bear Valley; Round Valley, Mt. San Jacinto.

2. **S. cernuus** Vahl. (S. riparius Spreng.) Common along streams, Santa Barbara; Los Angeles and San Bernardino Cos.

3. **S. americanus** Pers. (S. pungens Vahl.) Occasional on river bottoms, Orange, Los Angeles and San Diego Cos.

4. **S. Olneyi** Gray. Common among tules throughout the southern counties.

5. **S. paludosus** Nelson. Common along the New and Alamo Rivers and the irrigation ditches in Imperial Valley, *Parish.*

6. **S. campestris** Britt. (S. maritimus Wats.) Common along the lagoons near the coast.

7. **S. microcarpus** Presl. Common in meadows and along streams in the pine belt in all our mountains; rather rare near the coast.

8. **S. acutus** Muhl. (S. occidentalis Wats.) Very common along streams and in marshes. This and the next commonly called "Tule."

9. **S. californicus** Britt. (S. Tatora Kunth.) Common in brackish marshes, less abundant than the last.

5. ELOCHARIS. Spike Rush.

Annual or perennial herbs with leaves reduced to basal sheaths, the solitary terminal spikes without subtending bracts; stems erect, spikelets small; perianth of 1-12 bristles; stamens 2 or 3; base of the style swollen, persistent as a tubercle on the apex of the achene.

Style 2-cleft; achene lenticular.
Annual; achene black; tubercle flat............... 1. *E. capitata.*
Perennial; tubercle conical....................... 2. *E. palustris.*
Style 3-cleft; achene 3-angled or turgid.
Achene ribbed; tubercle conical; stems filiform..... 3. *E. acicularis.*
Achene puncticulate; tubercle disc-like........... 4. *E. disciformis.*
Achene smooth and shining.
Tubercle not continuous with the achene.
Spikelet oblong; tubercle broader at base than the apex of the achene................ 5. *E. montana.*
Spikelet lanceolate; tubercle calyptrate....... 6. *E. Parishii.*
Tubercle continuous with the achene, conical.... 7. *E. rostellata.*

1. **E. capitata** R. Br. In wet sand, San Bernardino, *Parish,* Palm Springs.

2. **E. palustris** R. & S. Common along streams.

Var. *glaucescens* Gray. Spikelets smaller; sheaths horizontal truncate; tubercle narrower and more acute. Lake Surprise, San Jacinto, *Hall;* San Bernardino, *Parish.*

3. **E. acicularis** R. & S. Moist places in the Los Angeles and Santa Ana Rivers.

Var. *radicans* Britt. Usually taller, scales tinged with brown, tubercle more conical. Pasadena; San Bernardino and San Jacinto Mts., more common than the species acc. to *Parish.*

4. **E. disciformis** Parish. Base of Mt. San Jacinto on the border of the Colorado Desert, type and only locality.

5. **E. montana** R. &. S. Borders of streams and marshes from San Bernardino to San Diego.

6. **E. Parishii** Britt. Mohave Desert; Palm Springs, type station.

7. **E. rostellata** Torr. San Bernardino, *Parish.*

6. FIMBRISTYLIS.

Ours a Cyperus-like perennial with a leafy base of short, narrow rough-edged leaves; umbels 3-8-rayed with a few involucral leaves shorter than the rays; perianth none; stamens 3; style ciliate, 2-cleft; acheme obovoid, striate.

1. **F. thermalis** Wats. North Fork, San Gabriel, *Miss Mohr;* borders of warm springs, Arrowhead and Waterman, *Parish.*

7. CLADIUM. Saw-grass.

Perennials with stout rhizomes, with tall stout stems, leafy throughout with elongated, channelled leaves; spikelets small, clustered in terminal and lateral panicles; perianth none; stamens 2-3; style 2-3-cleft, deciduous; achene ovoid or globose, without a tubercle.

1. **C. Mariscus** R. Br. Collected by Brewer nearly 50 years ago near San Gabriel; recently rediscovered by *Johnston* at Upland.

4. HEMICARPHA.

Low or dwarf setaceous annual with flattened stems, somewhat leafy at base, bearing 1-3 small spikelets, sessile in an involucrate cluster and distinguished from Scirpus by a minute hyaline scale at the base of the flower on the side next to the rachis of the spikelet; bristles none; stamen 1; style 2-cleft; nutlet nearly terete.

1. **H. occidentalis** Gray. In wet sand at Bluff Lake, *Parish.*

8. CAREX. Sedge.

Perennial herbs with grass-like rough edged leaves and triangular stems; flowers in spikes either wholly pistillate or staminate, or bearing staminate or pistillate flowers (androgynous); stamens 3; style 1, stigmas 2-3; achenes triangular, lenticular or plano-convex, completely enclosed in a sac-like bractlet called the perigynium.

Subgenus I. EUCAREX.

Staminate and pistillate flowers in separate, mostly simple and elongated spikes.

- Spikes more than one.
  - Perigynia attenuate to a beak ⅓ as long as the body, or longer.
    - Perigynia inflated and not filled by the achene. 1. *C. rostrata.*
    - Perigynia not inflated.
      - Pistillate spikes drooping.................... 2. *C. comosa.*
      - Pistillate spikes erect; perigynia hirsute.
        - Leaves scabrous .... 3. *C. lanuginosa.*
        - Leaves hirsute .... 4. *C. yosemitana.*
  - Perigynia short-beaked or beakless.
    - Pistillate spikes compactly many-flowered, cylindrical.
      - Stigmas 3.
        - Pistillate spikes stramineous, 10-15 cm. long. 5. *C. spissa.*
        - Pistillate spikes purplish or dark brown.
          - Bracts sheathing at base; beak 1 mm. long. 6. *C. Lemmonii.*

Bracts auriculate at base; beak .25 mm. long, minutely bidentate............... 7. *C. heteroneura.*
Stigmas 2.
Beaks bidentate; scales smooth............ 8. *C. nebraskensis.*
Beaks bidentate; hispidulous between teeth.. 9. *C. barbarae.*
Beaks entire or emarginate.
Pistillate spikes pedunculate, 3-5 cm. long; perigynia ovoid ....10. *C. senta.*
Pistillate spikes 6-12 cm. long, sessile; perigynia obovoid ....11. *C. Schottii.*
Pistillate spikes loose, few-flowered.
Stigmas 2.
Perigynia coriaceous, green; scales appressed ....12. *C. Hassei.*
Perigynia fleshy, yellowish, strongly ribbed..13. *C. aurea.*
Stigmas 3.
Perigynia globose, beak bidentate...........14. *C. globosa.*
Perigynia triquetrous.
Lowest bract sheathless..................15. *C. flaccifolia.*
Lowest bract long-sheathing..............16. *C. triquetra.*
Spikes solitary, staminate above.
Pistillate flowers loosely disposed...............17. *C. multicaulis.*
Pistillate flowers aggregated....................18. *C. exserta.*

SUBGENUS II. **VIGNEA.**

Staminate and pistillate flowers in the same sessile, mostly short and aggregated spikes; stigmas always 2.

Staminate flowers at the summit of the spikes.
Heads elongated, interrupted below, paniculately decompound, beaks serrulate.
Perigynia membranaceous, margined at base....19. *C. stenoptera.*
Perigynia not membranaceous, truncate at base..20. *C. alma.*
Heads ovoid to ovoid-oblong; spikes greenish, the lower compound ....21. *C. Douglasii.*
Heads ovoid or subglobose; spikes simple, perigynia suborbicular ....22. *C. diandra.*

Staminate or pistillate flowers in separate spikes or intermingled, or plants dioecious.

Perigynia marginless.
Spikes distant.
Spikes subglobose few-flowered.................23. *C. ormantha.*
Spikes oblong, many-flowered.................24. *C. Bolanderi.*
Spikes continuous, linear-oblong..................25. *C. praegracilis.*
Staminate flowers at the base of the spikes.
Spikes distant.
Spikes subglobose, few-flowered................23. *C. ormantha.*
Spikes oblong, many-flowered..................24. *C. Bolanderi.*
Spikes continuous, linear-oblong..................25. *C. praegracilis.*

Spikes loosely or compactly aggregated.
  Sheaths green-striate, opposite blades .... 26. *C. feta.*
  Sheaths white-hyaline, opposite blades .... 27. *C. fracta.*
Spikes brown or tawny.
  Perigynia marginless, smooth .... 28. *C. Jonesii.*
  Perigynia with membranaceous walls.
    Bracts inconspicuous, shorter than the heads.
      Spikes densely capitate; perigynia hyaline-tipped .... 29. *C. abrupta.*
      Spikes less dense; perigynia reddish-tipped .. 30. *C. mariposana.*
  Perigynia with thick walls, strongly serrulate ... 31. *C. teneraeform.*
    Bracts conspicuous, exceeding the heads ...... 32. *C. athrostachya.*

1. **C. rostrata** Stokes. Common in wet meadows at Bear Valley and Bluff Lake.

2. **C. comosa** Boott. A single plant found near San Bernardino, *Parish.*

3. **C. lanuginosa** Michx. Occasional near Los Angeles and San Bernardino.

4. **C. yosemitana** Bailey. San Jacinto Mts.

5. **C. spissa** Bailey. Stream banks of the coast region from Santa Barbara to San Diego.

6. **C. Lemmonii** Boott. San Bernardino Mts.; High Creek, San Gorgiono Mt., *Parish.*

7. **C. heteroneura** Boott. Tahquitz and Round Valley, San Jacinto Mt.; Vivian Creek, San Gorgonio Mt., *Parish.*

8. **C. nebraskensis** Dew. Bear Valley; San Jacinto Mt.; Mt. Pinos.

9. **C. barbara** Dew. Throughout the whole coast range.

10. **C. senta** Boott. San Fernando and Cienega, Los Angeles Co.; San Bernardino Mts.

11. **C. schottii** Dew. Forming dense tussocks, often with a naked trunk in marshes Los Angeles and San Bernardino Co's.

12. **C. Hassei** Bailey. Frequent on the higher mountain streams of the San Gabriel and San Bernardino Mts.

13. **C. aurea** Nutt. Bear Valley and Bluff Lake; Mt. San Antonio.

14. **C. globosa** Boott. Dry hills Santa Barbara to San Diego.

15. **C. flaccifolia** Mack. Dry plains southwestern California, *Jepson.*

16. **C. triquetra** Boott. Common on dry hills throughout the coast ranges.

17. **C. multicaulis** Bailey. Common in dry ground in the pine belt.

18. **C. exserta** Mack. On stony hillsides, Bear Valley, *Parish.*

19. **C. stenoptera** Mack. Icehouse Canyon, San Antonio Mts., type locality.

20. **C. alma** Bailey. Growing in robust clumps along most of our coast and mountain streams.

21. **C. Douglasii** Boott. Summit of Mt. Pinos. *Hall.*

22. **C. diandra** Schrank. In a meadow in San Bernardino Valley.

23. **C. ormantha** Mack. Bluff Lake.

24. **C. Bolanderi** Olney. Mill Creek Falls, *Parish.*

25. **C. praegracilis** Boott. Mountain Meadows from Santa Barbara to San Diego, the type locality.

26. **C. feta** Bailey. San Jacinto and San Bernardino Mts.

27. **C. fracta** Bailey. Common in wet places in the San Bernardino Mts.; Mt. Wilson.

28. **C. Jonesii** Bailey. Bluff Lake.

29. **C. abrupta** Mack. At high altitudes in the San Bernardino and San Jacinto Mts.

30. **C. mariposana** Bailey. San Gabriel and San Bernardino Mts., *Jepson.*

31. **C. teneraeformis** Mack. Ontario and San Antonio Mts.

32. **C. athrostachya** Olney. Bear Valley, *Parish.*

ORDER ARALES.

LEMNACEAE. Duckweed Family.

Minute perennial floating plants, each plant a modified stem (frond) floating free, beneath or upon the surface of pools or slow running streams; the inflorescence is a very simple form of spadix consisting of 1 pistillate and 1 or 2 staminate flowers inserted upon a common point; the pistillate consists of a single carpel containing from 1 to several ovules, and the staminate flower of a single stamen.

Fronds with roots.
  Roots more than 1 .... 1. Spirodela.
  Root solitary .... 2. Lemna.
Fronds rootless .... 3. Wolffiella.

1. SPIRODELA.

Stipe attached (peltately) to the frond back of and under the basal margin; reproductive pouches 2, triangular, opening as clefts in either margin of the basal portion of the frond; roots more than 1, fascicled; spadix of 1 pistillate and 2 staminate flowers; spathe sac-like; filaments curving upwards from the margin of the frond; anthers 2-celled; fruit rounded, lenticular, with wing margins.

1. **S. polyrrhiza** Schl. Near San Bernardino.

2. LEMNA. Duckweed.

Stipe attached to the basal margin of the frond; reproductive pouches 2, triangular, opening as clefts in either margin of the basal portion of the frond; root solitary; spadix of 1 pistillate and 2 staminate flowers; spathe various; filaments curving upward from the margin of the frond; anthers 2-celled dehiscing transversely.

Fronds long-stipitate, mostly submerged............ 1. *L. trisulca.*
Fronds short-stipitate or sessile, floating on the surface.
Fronds oblong-obovate.
Upper surface uniformly green; margin of the fruit unappendaged .... 2. *L. minor.*
Upper surface mottled with irregular brown streaks; margin of fruit with rounded wing lobes .... 3. *L. gibba.*
Fronds oblong to elliptical, small, green on both surfaces; fruit elongated erect......... 4. *L. minima.*
Fronds oblong, thin, unsymmetrical, obscurely 1-nerved .... 5. *L. cyclostasa.*

1. **L. trisulca** L. Bear Valley, San Bernardino Mts.

2. **L. minor** L. San Bernardino; not uncommon around Los Angeles, *Abrams.*

3. **L. gibba** L. Common on ponds and streams.

4. **L. minima** Phil. Bear Valley; Lakeside, *Abrams.*

5. **L. cyclostasa** Chev. (*L. valdivaina.*) Common on pools and slow streams.

3. WOLFFIELLA.

Stipe attached on the margin of the single reproductive pouch, pouch triangular, opening as a cleft in the basal margin of the frond; frond rootless, thin, unsymmetrical, curved in the form of a segment of a band, abundantly punctate on both surfaces with brown pigment cells; flowers and fruit unknown.

Fronds falcate, 3-5.5 times as long as broad.......... 1. W. OBLONGA.
Fronds tongue shaped, 1.5-3.5 times as long as broad. 2. W. LINGULATA.

1. **W. oblonga** Hglm. Near San Bernardino, *Parish*.
2. **W. lingulata** Hglm. San Bernardino, *Parish*.

ORDER LILIALES.

Styles wanting; sepals and petals very unlike....... 1. CALOCHORTACEAE.
Styles present.
  Styles distinct .... 2. MELANTHACEAE.
  Styles united.
    Sepals and petals chaffy......................... 3. JUNCACEAE.
    Sepals and petals not chaffy.
      Shrubby plants with caudices, or trees........ 4. DRACAENACEAE.
      Herbs with bulbs, corms, or rootstocks.
        Plants with elongated horizontal rootstocks. 5. CONVALLARIACEAE.
        Plants with bulbs or corms or short, erect rootstocks.
          Flowers in umbels at first included in and later subtended by a scarious involucre. 6. ALLIACEAE.
          Flowers solitary or racemose, without involucres .... 7. LILIACEAE.

1. CALOCHORTACEAE. MARIPOSA LILY FAMILY.

Bulbous plants with narrow, grass-like leaves and slender, glabrous scapes with showy flowers; petals and sepals very unlike; stamens 6; capsule attenuate or oblong.

1. CALOCHORTUS. MARIPOSA LILY.

Characters of the family.

Flowers drooping, petals white..................... 1. *C. albus*.
Flowers erect.
  Capsule oblong, obtuse; flowers lilac.............. 2. *C. catalinae*.
  Capsule narrowly-oblong, attenuate.
    Flowers yellow.
      Petals ciliate on the upper margin............ 3. *C. Weedii*.
      Petals with clavate hairs on inner surface.... 4. *C. clavatus*.
      Petals with hairs not clavate................. 5. *C. concolor*.
    Flowers lilac, purple or roseate.
      Petals ocellate or blotched above............. 6. *C. venustus*.
      Petals not ocellate.
      Flowers umbellate.
        Stems bulbiferous.
          Petals whitish with greenish stripe, claw dark .... 7. *C. invenustus*.
          Petals deep purple, claw yellow.......... 8. *C. montanus*.
        Stems not bulbiferous; petals striate........ 9. *C. striatus*.
      Flowers not umbellate.
        Sepals recurved; stems bulbiferous.
          Flower cup shallow; gland triangular..... 10. *C. paludicola*.

Flower cup deep.
Petals lilac, erose at apex............11. *C. splendens.*
Petals light purple; gland indefinite....12. *C. Palmeri.*
Sepals not recurved; petals very hairy within ....13. *C. Plummerae.*
Flowers scarlet ....14. *C. Kennedyi.*
Flowers white, sepals not recurved; stem not bulbiferous ....15. *C. Dunnii.*

1. **C. albus** Dougl. From Julian, San Diego Co., to Los Angeles foothills.

2. **C. catalinae** Wats. Foothills from Orange Co. to Santa Barbara. May-June.

3. **C. Weedii** Wats. Coast mountains of San Diego Co.

Var. *vestus* Purdy. Santa Barbara, Ventura and Orange Co's, not common. June.

4. **C. clavatus** Wats. Occasional in the Santa Monica Mts.; common in the Newhall district and ranging north to Santa Barbara. June.

5. **C. concolor** Purdy. Mountains of San Bernardino; Riverside and San Diego Co's, at about 1,500 meters altitude. June.

6. **C. venustus** Dougl. Abundant on dry hillsides in the canyons around Newhall and ranging north to the Sierras. Very variable in color and in the shape and quality of the markings. June.

Var. *sulphureus* Purdy. With the last but less common.

7. **C. invenustus** Greene. Common in the San Jacinto and San Bernardino Mts., below 1,500 meters altitude; Mt. San Antonio and the desert slope of the range.

8. **C. montanus** Davidson. Common in the San Bernardino and San Jacinto Mts., from 1,750-2,400 meters. July-Aug.

9. **C. striatus** Parish. In alkaline meadows. Rabbit Springs, Mohave Desert, type locality; Lancaster. May.

10. **C. paludicola** Davidson. Borders of wet meadows, Bear Valley; San Antonio Mts., *Kesslar.* July.

11. **C. splendens** Dougl. In the chaparral belt of the San Bernardino; San Gabriel Mts.; Santa Ana hills and the coast mesas to Santa Barbara. June.

12. **C. Palmeri** Wats. Mohave River, type locality; Little Rock Creek; rarely collected. May.

13. **C. Plummerae** Greene. Very common in the chaparral belt of Orange, Los Angeles and San Bernardino Co's. June.

14. **C. Kennedyi** Porter. Common in hard clay soils in the Mohave Desert and in the adjoining mountains. May-June.

15. **C. Dunnii** Purdy. Julian, San Diego Co., only locality.

2. MELANTHACEAE. Bunch-flower Family.

Herbs with bulb-like rootstocks, leaves broad or grass-like and parallel veined; flowers polygamous or dioecious, regular in racemes or panicles; perianth of 6 segments, nearly distinct; stamens 6; ovary superior or inferior; styles distinct.

Leaves large, oval clasping; perianth glandless...... 1. Veratrum.
Leaves long, linear; glands present.
  Ovary partly inferior; flowers 1 cm. long or more. 2. Anticlea.
  Ovary superior; flowers less than 1 cm. long, crowded .... 3. Toxicoscordion.

1. VERATRUM. Skunk Cabbage.

A stout, tall, leafy herb with ovate, lanceolate, sheathing, strongly nerved and plaited leaves and polygamous flowers in a terminal panicle; perianth cream color or greenish, with segments distinct; capsule 3-beaked, the persistent style divergent.

1. **V. speciosum** Rydb. Frequent in marshy places in the Transition Zone in the San Bernardino and San Jacinto Mts. July.

2. ANTICLEA.

Glabrous herbs from a truncated bulb with narrow leaves and greenish-white flowers in loose panicles, each segment bearing an obcordate gland near the base; ovary partly inferior. (*Zygadenus.*)

Inner segments clawed............................ 1. *A. Fremonti.*
All segments clawed.............................. 2. *A. brevibractus.*

1. **A. Fremonti** Torr. Occasional in the foothills from San Bernardino to San Diego Co. May.

2. **A. brevibractus** Hall. Mohave Desert and Cottonwood Springs, Colorado Desert. May.

3. TOXICOSCORDION. Death Camass.

General characters of the last but with smaller flowers, obovate or semi-orbicular glands and superior ovary.

1. **T. venenosum** Wats. Mountains of San Diego Co., *Orcutt.*

3. JUNCACEAE. Rush Family.

Grass-like or sedge-like annuals or perennial plants growing in tufts or from creeping rootstocks; leaves various, the sheaths open or closed, the blades flat, terete or wanting; inflorescence in heads, spikes or panicles; flowers regular, perfect; sepals 3, more or less glume-like; stamens 3-6; ovary superior 1- or 3-celled, forming a 1-3-celled capsule with 3-many small, sometimes caudate, seeds.

Leaves hairy, the sheaths closed; capsule 1-celled; seeds 3 .... 1. Luzula.

Leaves smooth, the sheaths open; capsules mostly 3-celled; seeds numerous............... 2. Juncus.

1. LUZULA. Wood Rush.

Ours hairy slender grass-like herbs with flat leaves, the leaf sheaths closed; flowers small, glomerate or umbellate; capsule 1-celled, 3-seeded.

1. **L. comosa** Mey. San Jacinto Mt.,; San Antonio Mts., *Johnston;* Bear Valley, San Bernardino Mts. July-August.

Var. *macrantha* Wats. Seeley's flat and Bluff Lake, San Bernardino Mts., *Parish.*

2. JUNCUS. Rush.

Glabrous mostly perennial herbs of wet soil with simple terete or flattened, pithy stems; flowers solitary, clustered or in open panicles; capsule 3-celled or rarely 1-celled; seeds numerous.

Annual.

Flowers solitary, subtended by 2 bracteoles.

Capsule trigonus-oblong to ovoid; perianth embracing the capsule .... 1. *J. bufonius.*

Capsule short-ovoid; perianth with spreading tips .... 2. *J. sphaerocarpus.*

Flowers 1-3, without bracteoles................ 3. *J. triformis.*

Perennial.

Inflorescence apparently lateral; the lowest bract erect apparently continuous with the stem.

Flowers few or in panicles, (not capitate).

Flowers in clusters bracteate only at the base of the pedicel.

Stems leafless or inner sheaths blade-bearing.

Capsule trigonus-subglobose, brownish.. 4. *J. acutus.*

Capsule trigonus-ovate, yellowish...... 5. *J. Cooperi.*

Flowers solitary, each subtended by 2 bracteoles and borne on a pedicel which is 1-bracted at the base.

Stems leafy at base; leaves linear, shorter than the stems.

Leaves flattened, their sheaths auriculate; flowers numerous............ 6. *J. interior.*

Leaves terete; flowers 1-5, one subsessile, the others pedicellate....... 7. *J. Parryi.*
Stems with basal sheaths bladeless.
Stamens 3, capsule trigonus-obovoid.. 8. *J. effusus.*
Stamens 6.
Subepidermal fascicles present, stems therefore sulcate.
Perianth segments 4-5 mm. long, converging on the fruit........ 9. *J. textilis.*
Perianth segments 3 mm. long, diverging from the fruit........ 10. *J. patens.*
Subepidermal fascicles absent; stems smooth or finely striate.
Stems pithy; perianth 3-4 mm. long. .... 11. *J. balticus.*
Stems mostly fistulous; perianth 5-6 mm. long................. 12. *J. Leseurii.*
Stems with uppermost basal sheath blade bearing; stem compressed and usually contorted. .... 13. *J. mexicanus.*
Inflorescence manifestly terminal.
Leaves transversely ribbed by internal septae.
Leaves ensiform, the edges towards the compressed stem.
Stems wingless .... 14. *J. phaeocephalus.*
Stems narrowly winged.
Heads discrete; styles long........... 15. *J. oxymeris.*
Heads condensed, numerous; styles short .... 16. *J. xiphioides.*
Leaves terete, fistulous.
Heads conglomerate, densely 30-80-flowered .... 17. *J. Torreyi.*
Heads small, discrete, 6-10-flowered.
Stems smooth or finely striate.......... 18. *J. dubius.*
Stems and leaves transversely rugose.... 19. *J. rugulosus.*
Leaves grass-like.
Septae obscure.
Heads single, 10-20-flowered........... 20. *J. Mertensianus.*
Heads several, 6-10-flowered........... 21. *J. nevadensis.*
Septae absent.
Ligules auriculate .... 22. *J. canaliculatus.*
Ligules without auricles.
Perianth 6 mm. long, its segments equal, acute, exceeding the capsule.. 23. *J. latifolius.*
Perianth 4 mm. long, its segments obtuse, unequal in texture, shorter than the capsule.................. 24. *J. obtusatus.*

1. **J. bufonius** L. Very common along the borders of streams on plain and mountain.

2. **J. sphaerocarpus** Nees. Borders of Cuyamaca Lake; Strawberry Valley; Santa Ana River; Santa Isabel, San Diego Co. *Parish.*

3. **J. triformis uniflorus** Engelm. On wet sandbars Bear Valley, San Bernardino Mts.; Lake Surprise, San Jacinto Mts.; Campo, San Diego Co., *Parish.*

4. **J. acutus sphaerocarpus** Engelm. Common along the sea coast marshes and occasional on the borders of the Colorado Desert. (J. robustus Wats.)

5. **J. Cooperi** Engelm. Borders of saline marshes in the Colorado and Mohave Deserts.

6. **J. interior** Wieg. San Bernardino Mts.

7. **J. Parryi** Engelm. Summit of San Gorgonio, *Parish.*

8. **J. effusus** L. At middle elevations in the mountains from San Bernardino to the Cuyamaca Mts.

9. **J. textilis** Buchen. Occasional in the foothills.

10. **J. patens** Mey. Santa Monica Range, *Hasse.*

11. **J. balticus** Wild. Common and generally distributed.

12. **J. Leseurii** Bol. Lytle Creek, *Parish.*

13. **J. mexicanus** Willd. Death Valley; occasional in the mountains.

14. **J. phaeocephalus paniculatus** Engelm. Generally distributed along the coast and mountain streams.

15. **J. oxymeris** Engelm. San Bernardino and San Jacinto Mts.

16. **J. xiphioides** Mey. Frequent along streams and marshes.

17. **J. Torreyi** Cov. Occasional along stream borders in Los Angeles, Orange and San Bernardino Co's.

18. **J. dubius** Engelm. Witch Creek and Cuyamaca Mts., San Diego Co.

19. **J. rugulosus** Engelm. Fairly common and widely distributed along mountain streams.

20. **J. Mertenseanus** Bong. Mill Creek, San Bernardino Mts.; Round Valley, San Jacinto Mts., *Parish.*

21. **J. nevadensis** Wats. Common in meadows at Bear Valley.

22. **J. canaliculatus** Engelm. Common on dry ridges on the higher mountains and their desert slopes.

23. **J. latifolius** Buchen. Bear Valley and Bluff Lake, *Parish.*

24. **J. obtusatus** Engelm. Little Bear Valley, *Parish.*

4. DRACAENACEAE. Yucca Family.

Trees or shrubby plants with narrow, rigid leaves and flowers in terminal racemes or panicles; perianth greenish or white, the segments alike; ovary superior, 1-3-celled; styles united; ovules few to many; fruit a loculicidal capsule, or berry-like and indehiscent.

Flowers polygamo-dioecious; seeds solitary.......... 1. Nolina.
Flowers perfect; seeds many.
  Plants subacaulescent; leaves finely denticulate... 2. Hesperoyucca.
  Trees.
    Trunk branching freely at summit; leaves serrate on margins .... 3. Cleistoyucca.
    Trunk simple or shortly branched; leaves smooth on margins .... 4. Yucca.

1. NOLINA. Bear Grass.

Perennials with thick, woody trunk with numerous narrowly rigid leaves and a stout, nearly naked stem bearing a compound, many-flowered panicle, the main branches subtended by foliaceous bracts; perianth of 6 small, 1-nerved segments; stamens 6, included, mostly wanting in the fertile flowers; capsule subglobose.

Leaf margins serrulate........................... 1. *N. Parryi.*
Leaf margins roughish........................... 2. *N. Bigelovii.*

1. **N. Parryi** Wats. Mohave slope of the San Bernardino Mts.; borders of the Colorado Desert. June.

2. **N. Bigelovii** Wats. Southeastern border of the Colorado Desert. June.

2. HESPEROYUCCA. Spanish Bayonet.

Subacaulescent perennial with woody base, flat needle-pointed fibrous leaves and white flowers borne on a tall pithed spike; perianth broadly campanulate; stigma capitate, long-papillate, minutely perforate. (*Yucca.*)

1. **H. Whipplei** Baker. Common in the chaparral belt in all our mountains, both on coast and desert. June.

Var. *graminifolia* Wood. Longer and more slender leaves; flowers frequently with a purplish tinge. The common form near the coast, the typical form is more characteristic of the desert and interior mountains.

3. CLEISTOYUCCA. Joshua Tree.

A palm-like tree branching freely at the top; leaves serrate, densely clothing the stem; flowers greenish-white, the segments thick, style wanting. (*Yucca.*)

1. **C. arborescens** Trelease. Forming extensive groves in the Mohave Desert and extending northwards through Inyo Co.

4. YUCCA. YUCCA.

Differs from the last in possessing a more simple stem with short branches; leaves smooth on the margins and a short style.

1. **Y. mohavensis** Sarg. Scattered with the last on the Mohave Desert; western border of the Colorado Desert to the coast in San Diego Co.

5. CONVALLARIACEAE. LILY-OF-THE-VALLEY FAMILY.

Perennial herbs arising from rootstocks, never from corms or bulbs, leaves alternate; flowers perfect in terminal panicles or axillary clusters; perianth segments more or less united at the base; pistils 3-parted; fruit a berry.

Leaves reduced to scales; branches filiform......... 1. ASPARAGUS.
Leaves large, lanceolate, sessile..................... 2. VAGNERA.

1. ASPARAGUS. ASPARAGUS.

Tall perennial with filiform branchlets, leaves reduced to scales and small, greenish-yellow flowers in axillary clusters; pedicels jointed.

1. **A. officinalis** L. An escape from cultivation, in some localities seemingly established.

2. VAGNERA. FALSE SOLOMON'S SEAL.

Stems simple, leafy with alternate, sessile, lanceolate leaves and small white flowers in terminal panicles; perianth segments distinct; stamens 6; fruit a globose red berry. *(Smilacina.)*

Flowers many; stamens exserted................ 1. *V. amplexicaulis.*
Flowers few; stamens not exserted............. 2. *V. sessilifolia.*

1. **V. amplexicaulis** Greene. Onstatt Valley and Deer Springs, San Jacinto Mt., *Hall.*

2. **V. sessilifolia** Greene. Damp places in the Transition Zone, San Bernardino; San Diego and San Antonio Mts., *Johnston.* July.

6. ALLIACEAE. ONION FAMILY.

Perennial herbs with scaly or reticulate-coated bulbs and narrow, frequently single leaves; flowers in terminal umbels, at first enclosed in an involucre; perianth segments all alike, persistent; stamens 6; capsule 3-celled.

Perianth segments distinct or nearly so.
Plants with alliaceous odor .... 1. ALLIUM.
Plants without alliaceous odor.
Flowers greenish-white .... 2. MUILLA.
Flowers yellow .... 3. BLOOMERIA.
Perianth segments united below into a tube.
Stamens 6.
Inner stamens appendaged .... 4. DICHELOSTEMMA.
Stamens unappendaged .... 5. TRITELEIA.
Stamens 3, staminodia 3 .... 6. HOOKERA.

1. ALLIUM. ONION.

Scapes and leaves from a coated bulb; flowers in umbels subtended by 2-5 scarious bracts; perianth segments nearly equal, white or purplish; filaments sometimes dilated below; the 3-lobed capsule frequently crested.

Scapes terete.
Scapes over 3 dm. high; leaves 2 or more.
Corm with bulb-bearing offshoots; perianth rose colored, 10-14 mm. long .... 1. *A. unifolium.*
Corm without bulblets; perianth white or light pink, 6-8 mm. long; leaves filiform above .... 2. *A. amplectens.*
Scapes less than 3 dm. high.
Bulbs long, narrow.
Bulbs blood red; ovary crests smooth .. 3. *A. haematochiton.*
Bulbs dark brown; ovary crests rough. 4. *A. Marvinii.*
Bulbs round or ovate.
Scapes terete.
Stigmas 3-cleft.
Filaments dilated at base.
Leaf solitary; ovary 6-crested ... 5. *A. Kessleri.*
Leaves 2.
Ovary crest collar-like; perianth red purple, 10-12 mm. long. 6. *A. peninsularis.*
Ovary smooth; perianth like the last, but segments narrower. 7. *A. montigenum.*
Ovary crests triangular in parallel pairs; perianth pinkish, 6 mm. .... 8. *A. tenellum.*
Filaments linear.
Leaf solitary; perianth purplish.
Ovary crests emarginate or erose .... 9. *A. Parryi.*
Ovary crests fimbriate .... 10. *A. fimbriatum.*
Ovary crests prominent, irregularly toothed .... 11. *A. Parishii.*

Stigma not divided.
Leaf solitary; filaments deltoid at base.
Stamens and style exserted; perianth light rose ....12. *A. Burlevii.*
Stamens not exserted.
Pistils 8 mm. long; crests thin, vertical; leaf long and fleshy......13. *A. monticola.*
Pistil 2 mm. long; ovary granulose; leaves 1 or 2, smaller..........14. *A. tribracteatum.*
Leaves 2.
Filaments deltoid at base.
Crests thin, conspicuous; perianth rose colored ....15. *A. bisceptrum.*
Crests obscure; perianth pinkish..16. *A. lacunosum.*
Filaments linear.
Stamens slightly exserted; perianth white; ovary smooth; old bulbs persistent ....17. *A. pseudobulbiferum.*
Stamens not exserted; perianth pink; crests conspicuous........18. *A. campanulatum.*
Scape flattened, 2-edged; crests obtuse.....19. *A. anceps.*

1. **A. unifolium** Kell. Coast ranges Mendocino to San Diego, acc. to Bot. Cal.

2. **A. amplectens** Torr. Near San Diego, *Orcutt;* Temescal, *Mohr;* Corona hills.

3. **A. haematochiton** Wats. Usually in colonies, Santa Monica Range; San Diego Co.; Ojai Valley; San Jacinto; *Hall.* April-May.

4. **A. Marvinii** Davidson. Mountains east of Banning. May.

5. **A. Kessleri** Davidson. Common on gravelly slopes, Little Bear Creek, San Bernardino Mts., type locality. July.

6. **A. peninsularis** Greene. Santa Ana River near San Bernardino, *Parish.*

7. **A. montigenum** Davidson. Common on the foothill slopes of the San Gabriel (type locality) and San Antonio Mts. May.

8. **A. tenellum** Davidson. Plains near San Julian, type locality. May.

9. **A. Parryi** Wats. San Bernardino Mts., type locality.

10. **A. fimbriatum** Wats. Common on the Mohave Desert and adjacent foothills.

11. **A. Parishii** Wats. Cushenberry Springs, type locality.

12. **A. Burlevii** Davidson. In dense colonies on Mt. San Antonio, type locality; Little Baldy and Baldy Lookout, *Johnston.* May-July.

13. **A. monticola** Davidson. Rocky slopes of Mt. Markham, type locality; Mt. San Antonio, *Burlew.*

14. **A. tribracteatum** Torr. Mt. Fraser, *Fultz.* July.

15. **A. bisceptrum** Wats. Hillsides, Transition Zone, San Bernardino Mts., *Parish.*

16. **A. lacunosum** Wats. San Jacinto and San Gabriel Mts., *Jepson.*

17. **A. pseudobulbiferum** Davidson. Hillsides near Victorville, type locality. May.

18. **A. campanulatum** Wats. Near Colton, *Parish.*

19. **A. anceps** Kell. Dry ridges, Bear Valley, *Parish.*

2. MUILLA.

Plants with the general appearance of an *Allium* but without their characteristic odor; pedicels not jointed under the perianth; perianth segments 6, white or greenish-white, distinct or nearly so; stamens 6.

Petals greenish-white; filaments slightly dilated at base .... 1. *M. serotina.*
Petals green with bluish margin, pale blue within; filaments petaloid and much dilated at base .... 2. *M. coronata.*

1. **M. serotina** Greene. Frequent on dry stony ridges of the foothills and interior plains. June-July. Glendale Hills; type locality.

2. **M. coronata** Greene. Mohave Desert. March.

3. BLOOMERIA. Golden Stars.

Stems erect from a fibrous coated corm; leaves linear, keeled; flowers in a many-rayed umbel, subtended by membraneous bracts; pedicels jointed at the summit; perianth yellow of six nearly equal segments; stamens 6; filaments surrounded at base by a cup-like winged and often bicuspidate appendage; capsule subglobose.

Leaf solitary, 6-12 mm. broad...................... 1. *B. crocea.*
Leaves several, 2 mm. broad........................ 2. *B. Clevelandi.*

1. **B. crocea** Cov. Common on foothill mesas from Santa Barbara to San Diego. June.

2. **B. Clevelandi** Greene. Mesas near San Diego, type locality.

5. TRITELEIA.

Scape stout from a deep-seated corm with 1 or 2 long, linear leaves and umbels of light blue or white flowers; stamens 6 in 1 or 2 rows, filaments with or without wing appendages; ovary on a slender stipe, rarely almost sessile. (*Brodiaea* in part.)

Filaments naked, stamens in 2 rows; perianth light blue, its segments nearly equalling the tube; stipe long...................... 1. *T. candida.*
Filaments winged, stamens in 1 row; perianth white, its segments much longer than the short tube; stipe very short................ 2. *T. lactea.*

1. **T. candida** Greene. Abundant on Los Feliz Hills, Los Angeles, the only known locality south of the Tehachapi Mts. May-June.

2. **T. lactea** Wats. On brushy hillside near Camp Baldy, *Miss Jessie Potter.*

4. DICHELOSTEMMA. CLUSTER LILY.

Scape erect from a fibrous coated corm with usually 2 fleshy, keeled leaves and bluish purple flowers in an umbel with unequal rays, subtended by 3 or more dark colored bracts; perianth tube funnelform, shorter than the segments; stamens 6, the inner wing-appendaged. (*Brodiaea* in part.)

1. **D. capitata** Wood. Very common and one of the earliest flowers of the foothills.

6. HOOKERA.

Flowers in loose, rather few-flowered umbels on a short, rigid scape; perianth turbinate, purple, the segments equalling the tube; filaments 6, the 3 outer being reduced to staminodia or absent. (*Brodiaea* in part.)

Staminodia present.
  Anthers 4 mm. long, nearly twice the length of the triangular staminodia; leaves linear-filiform...... 1. *H. filifolia.*
  Anthers 4 mm. long, shorter than the emarginate staminodia .... 2. *H. minor.*
  Anthers 8-10 mm. long, exceeding the acute staminodia .... 3. *H. coronaria.*
Staminodia absent.
  Perianth segments twice the length of the tube .... 4. *H. Orcuttii.*
  Perianth segments about half the length of the tube .... 5. *H. multipedunculata.*

1. **H. filifolia** Greene. Near Arrowhead. Hills north of Glendora. May-June.

2. **H. minor** Britten. Occasional in meadows or foothill mesas. May-June.

3. **H. coronaria** Salisb. (*Brodiaea grandiflora* Smith.) Little Bear Valley, *Parish.*

4. **H. Orcuttii** Greene. San Diego Co., north from San Diego.

5. **H. multipedunculata** Abrams. Cuyamaca Lake, *Abrams.* June.

7. LILIACEAE. Lily Family.

Perennials with bulbs or corms, alternate or whorled leaves; flowers solitary or in terminal racemes, corymbs or panicles; sepals and petals similar; stamens 6; styles united; fruit an angled capsule.

Bulbs scaly.
  Perianth segments 7-10 cm. long................ 1. Lilium.
  Perianth segments 2.5 cm. long or less........... 2. Fritillaria.
Bulbs tunicated.
  Perianth white, 3.5-5 cm. long.................. 3. Hesperocallis.
  Perianth white, purplish-veined or pinkish, 1 cm. long or less........................ 4. Chlorogalum.

1. LILIUM. Lily.

Stems simple, leafy, from scaly bulbs with leaves sessile, whorled or scattered; flower large and showy, solitary or racemose; pedicels not jointed.

Flowers white, purple dotted, segments spreading .... 1. *L. washingtonianum.*
Flowers lemon-yellow, inconspicuously spotted. 2. *L. Parryi.*
Flowers orange-red with maroon spots....... 3. *L. humboldtii.*

1. **L. washingtonianum** Kell. Cuyamaca Mts. June.

2. **L. Parryi** Wats. Wet meadows, San Bernardino; San Antonio and San Diego Mts. July.

3. **L. humboldtii** R. & L. Frequent in the canyons of the foothills. June-July.

2. FRITILLARIA. Fritillary.

Erect plants with simple stems, dull-purple or brownish flowers in simple racemes and fleshy scaled bulbs; perianth campanulate, united to the middle.

Bulbs with fleshy scales; flowers nodding.
  Flowers dark brown; leaves broadly lanceolate... 1. *F. biflora.*
  Flowers mottled; leaves narrow.
    Flower segments 20 mm. long................. 2. *F. ojaiensis.*
    Flower segments 12 mm. long................. 3. *F. atropurpurea.*
Bulbs with rice-grain bulblets; flowers erect......... 4. *F. pinetorum.*

1. **F. biflora** Lindl. Mission Bells. Brown Lily. Canyon slopes from Santa Barbara to San Diego. May.

2. **F. ojaiensis** Davidson. Ojai Valley, type locality, *Martindale*. April.

3. **F. atropurpurea** Nutt. Bear Valley, *Kessler*. June.

4. **F. pinetorum** Davidson. Ranging at high altitudes in the San Antonio, San Gabriel and San Bernardino Mts. June.

3. HESPEROCALLIS. Desert Lily.

Stems stout from a tunicated bulb; flowers large, in a simple raceme with conspicuous scarious bracts; perianth white, 3.5-5 cm. long; pedicels jointed; capsule deeply 3-lobed.

1. **H. undulata** Gray. Borders of the Colorado River. March-April.

4. CHLOROGALUM. Soap-plant. Amole.

Stems 8-12 dm. tall, nearly leafless with a spreading panicle; basal leaves linear, flaccid, the margins more or less undulate; perianth segments white, purplish-veined; pedicels jointed at the summit.

Perianth segments narrowly ligulate, 16-20 mm. long; leaves 8 mm. or more broad..	1. *C. pomeridianum.*
Perianth segments oblong-oblanceolate, 5 mm. long; leaves 4-6 mm. broad.........	2. *C. parviflorum.*

1. **C. pomeridianum** Kunth. Common on sunny foothills from Santa Barbara to Los Angeles Co. June.

2. **C. parviflorum** Wats. Hills near San Diego. May-June.

ORDER AMARYLLIDALES.

Stamens 6; leaves not 2-ranked.................	1. Amaryllidaceae.
Stamens 3; leaves 2-ranked....................	2. Iridaceae.

1. AMARYLLIDACEAE. Amaryllis Family.

Perennial herbs with bulbs or fibrous roots; leaves basal, not 2-ranked; flowers regular or irregular; stamens 6; ovary inferior, 3-celled; styles united; fruit a capsule or a berry.

1. AGAVE. Century Plant.

Acaulescent or short stemmed perennial with thick, fleshy basal leaves and tall flower stalk; perianth tubular, fleshy, persistent, 6-cleft; filaments exserted, anthers versatile; fruit a 3-celled capsule.

Leaf with a toothed horny margin decurrent for some distance below end-spine.	
Flowers yellow	1. *A. utahensis.*

Leaf with a horny margin which usually includes at least the upper teeth and sometimes extends nearly to the base.
Flowers yellow; base of leaves spiny.......... 2. *A. deserti.*
Flowers greenish-yellow; base of leaves denticulate .... 3. *A. Shawii.*

1. **A. utahensis** Engl. Northeast border of the Mohave Desert.

2. **A. deserti** Engl. Colorado Desert and eastern mountains of San Diego Co.

3. **A. Shawii** Engl. Mexican border of San Diego Co.

2. IRIDACEAE. Iris Family.

Perennial herbs with elongated rootstocks; leaves equitant, 2-ranked; flowers regular with spathe-like bracts; perianth showy; sepals 3; petals 3, often very unlike, distinct or united at the base; stamens 3; ovary inferior; styles 3-cleft at the apex, the stigmatiferous branches often petaloid; capsule 3-celled.

Sepals much larger than the petals; styles opposite the stamens; leaves broad.............. 1. Iris.
Sepals and petals nearly equal; styles alternate with the stamens; leaves narrow............ 2. Sisyrinchium.

1. IRIS. Blue Flag. Fleur-de-lis.

Stout glabrous plant with thick rootstocks and linear leaves; perianth pale blue, showy, segments unlike; filaments distinct.

Stems leafy; bracts separate, 5-7.5 cm. long........... 1. *I. Hartwegi.*
Stems naked or nearly so; bracts contiguous, 2.5-3.5 cm. long .... 2. *I. missouriensis.*

1. **I. Hartwegi australis** Parish. Dry hillsides, Transition Zone, San Bernardino Mts. July.

2. **I. missouriensis** Nutt. Abundant on the borders of Bear Valley Dam. July.

2. SISYRINCHIUM. Blue-eyed Grass.

Simple perennial grass-like plants with geniculate and winged stems and small blue or blue and yellow flowers; stigmas filiform; filaments connate.

Flowers 12-20 mm. long.......................... 1. *S. bellum.*
Flowers 8-12 mm. long, yellow eye small............ 2. *S. Eastwoodiae.*
Flowers 8-10 mm. long; stems simple............... 3. *S. oreophilum.*

1. **S. bellum** Wats. The common species of the coastal hills. May.

2. **S. Eastwoodiae** Bickn. San Bernardino and San Bernardino Mts.; San Ysabel and Cuyamaca Mts., *Bicknell.*

3. **S. oreophilus** Bickn. Common in springy places in the Upper Transition Zone, San Antonio Mts., *Johnston.* June.

ORDER PALMALES.

PALMACEAE. PALM FAMILY.

Unbranched columnar trees bearing the leaves in a terminal tuft; leaves sharply plaited at first; flowers monoecious; perianth small of 3-6 equal segments; stamens 6; carpels 3, 1-ovuled; fruit, a berry drupe or nut.

1. WASHINGTONIA. FAN PALM.

Ours a tree from 20-60 meters high, the fan-shaped leaves large, the petioles armed with stout hooked prickles; flowers borne on a long branched panicle; seeds large with a thin, fleshy rind.

1. **W. filifera** Wendl. Most numerous in Palm Canyon and the other canyons on the desert base of Mt. San Jacinto; Whitewater Canyon and in a few of the canyons farther east.

ORDER ORCHIDALES

ORCHIDACEAE. ORCHID FAMILY.

Perennial herbs with entire leaves; flowers perfect, irregular, 3-merous, corolla of 2 similar lateral petals, the superior petal (apparently inferior) dissimilar and called the lip, which is sometimes spurred and saccate; stamens coherent with the style forming the column; anthers usually single, pollen in coherent masses; ovary inferior; fruit a capsule.

Plants without green leaves........................ 1. CORALLORHIZA.
Plants with green leaves.
  Perianth with a spur.
    Stem leaves abruptly reduced, the basal ones withering before anthesis.............. 2. PIPERIA.
    Stem leaves gradually reduced, the basal not withering till the fruit is set........... 3. LIMNORCHIS.
  Perianth not spurred.
    Leaves 2 or more.
      Flowers crowded in a twisted spike; leaves basal .... 4. IBIDIUM.
      Flowers in a loose raceme.
        Leaves 2, near middle of the stem; lip 2-lobed .... 5. OPHYRS.
        Leaves many; bracts conspicuous; lip a large inflated sac .... 6. EPIPACTIS.
    Leaf single, sheathing the base of the stem; bulb solid .... 7. ACHROANTHES.

1. CORALLORHIZA. Coral Root.

Stem simple, erect from a cluster of coral-like rootstocks with 2-4 membranaceous sheaths representing the leaves; flowers purplish; lateral sepals decurrent in a short spur adnate to the ovary; lip recurved, ridged near the base.

1. **C. maculata** Raf. Frequent in the shade of pine trees in the San Bernardino and San Jacinto Mts.; rare in the San Antonio Mts., *Johnston.*

2. PIPERIA. Rein-orchis.

Stems leafy below, changing abruptly to bract-like leaves above; spikes many-flowered; flowers white or greenish, sepals and petals nearly equal, 1-nerved, the lateral sepals united with the claw of the lip, blade of the lip hastate or truncate at the base; anthers opening laterally; ovary sessile.

Spur less than twice as long as the lip.
  Spur slightly exceeding the lip, very saccate...... 1. *P. Cooperi.*
  Spur nearly twice as long as the lip, slightly clavate. 2. *P. lancifolia.*
Spur 2-3 times as long as the lip.
  Spikes elongated, lax; leaves withering at anthesis.
    Stems leafy only at base; bracts linear lanceolate. 3. *P. elegans.*
    Stems usually leafy; bracts ovate lanceolate.... 4. *P. longispica.*

1. **P. Cooperi** Rydb. Clay hills near San Diego, type locality.

2. **P. lancifolia** Rydb. Occasional in the foothills of the San Gabriel and Santa Monica ranges, the latter the type locality.

3. **P. elegans** Rydb. Lower Transition Zone, San Bernardino Mts., not common.

4. **P. longispica** Rydb. Santa Monica Range; Cucamonga Mts.; San Bernardino Mts.

3. LIMNORCHIS. Bog-orchis.

Resembling the last, but with the stem leaves gradually reduced and the lateral sepals free at the base; sepals 3-7-nerved; anthers opening in front.

Flowers greenish; stipe very lax.
  Lip about 8 mm. long, spur not over 10 mm. long, filiform .... 1. *L. sparsiflora.*
  Lip about 6 mm. long, spur about 8 mm. long, somewhat clavate .... 2. *L. laxiflora.*
Flowers white or whitish.
  Lip lanceolate, dilated at the base.
    Spur ⅔ longer than the lip, dilated portion of the lip oval.............................. 3. *L. Thurberi.*
    Spur scarcely ½ longer than the lip, dilated portion, rhombic .... 4. *L. leucostachys.*

1. **L. sparsiflora** Rydb. Upper San Antonio Canyon, *Johnston;* Mill Creek Canyon, *Parish.*

2. **L. laxiflora** Rydb. Whitewater Basin, *Parish.*

3. **L. Thurberi** Rydb. Meadows, San Bernardino Mts., *Parish.*

4. **L. leucostachys** Rydb. In wet meadows in the mountains of Riverside, San Bernardino and Los Angeles Co's.

4. IBIDIUM. Ladies' Tresses.

Stems erect with a few basal leaves and white flowers, 1-3-ranked in a spirally twisted spike; perianth oblique upon the ovary, the sepals and petals connivent; lip embracing the column with 2 callosities at the base; spurs absent. *(Spiranthes.)*

Lip much dilated at the apex, the callosities small. 1. *I. Romanzoffianum.*
Lip little dilated at the apex, the callosities larger. 2. *I. porrifolium.*

1. **I. Romanzoffianum** House. Riviera; Glendale and occasonal in the Santa Monica hills. May-June.

2. **I. porrifolium** Rydb. Abundant in wet meadows, Bluff Lake, *Parish.* July.

5. OPHYRS. Twayblade.

Stems slender, low, with a pair of broad, sessile opposite leaves in the middle; flowers small, greenish, in a loose raceme; perianth spreading, lip 2-lobed. *(Listera.)*

1. **O. convallarioides** Wight. Shaded canyons north side of San Jacinto Mt., *Hall.*

6. EPIPACTIS. Helleborine.

Stems stout and leafy from a creeping rootstock; flowers few, rather large, in a conspicuously bracted raceme; lip dilated above, auricled at base; capsules reflexed at maturity.

1. **E. gigantea** Dougl. Common on moist banks in the mountain canyons. June-July.

7. ACHROANTHES. Adder's-mouth.

Low herb with a solid bulb, single leaf and several scales at the base of the stem; flowers whitish in a terminal raceme; sepals spreading; petals filiform, lip cordate, eared at the base; anthers 2-celled; pollinia 4, smooth and waxy; capsule oval, beakless. *(Malaxis.)*

1. **A. monophylla** Greene. Meadow on the South Fork of the Santa Ana River, *Pierson.* Aug.

SUBCLASS DICOTYLEDONES.

ORDER PIPERALES.

SAURURACEAE. LIZARD-TAIL FAMILY.

Perennial herbs with scapose stems and alternate petioled leaves; flowers perfect, bracteate in a dense terminal spike; perianth none; stamens 5-8; stigmas 1-5; fruit a capsule or berry.

1. ANEMOPSIS. YERBA MANSA.

Perennial herb with long stolons, large oblong radical leaves and small flowers crowded on a terminal conical spike; involucral bracts petal-like, white; ovary sunk in the rachis of the spike; stigmas 2 or 3.

1. **A. californica** Hook. Usually in large patches in low moist grounds.

ORDER SALICALES.

1. SALICACEAE. WILLOW FAMILY.

Trees or shrubs with simple alternate deciduous leaves; flowers dioecious, in catkins; bracts of the aments scale-like; perianth none; stamens 1-several; ovary 1-celled; stigmas 2; fruit a small capsule; seeds very numerous, small, comose.

Stamens 1-5; pods small, narrow.................. 1. SALIX.
Stamens numerous; pods larger, globose............ 2. POPULUS.

1. SALIX. WILLOW.

Shrubs or small trees with linear or elliptic leaves and flowers in aments appearing before or with the leaves; perianth of a single scale; stamens 1-9; pistils single with a gland at the base of the ovary; capsule 2-valved; seeds hairy.

Stamens 3 or more.
Petioles with glands near the summit.
Stipules conspicuous, glandular................ 1. *S. lasiandra.*
Petioles not glandular.
Stipules glandular; leaves narrow, nearly alike on both faces .... 2. *S. nigra.*
Stipules not glandular; leaves broadly lanceolate, glaucous beneath .... 3. *S. laevigata.*
Stamens 2.
Scales of the ament black or black-tipped.
Capsule glabrous.
Catkins sessile; leaves dark green above, white pubescent beneath .... 4. *S. lasiolepis.*
Catkins shortly peduncled; leaves light green above, paler beneath................. 5. *S. Watsoni.*

Capsule pubescent.
  Leaves broadly obovate; aments appearing before the leaves........................ 6. *S. Scouleriana.*
  Leaves oblong-lanceoalte, acute; aments appearing with the leaves................ 7. *S. glaucops.*
Scales of the ament pale.
  Leaves sparsely adpressed-pubescent; ovary glabrous .... 8. *S. exigua.*
  Leaves more or less silvery.................... 9. *S. argophylla.*

1. **S. lasiandra** Benth. Occasional in Los Angeles Co.; San Bernardino and the San Bernardino Mts.

2. **S. nigra vallicola** Dudley. Frequent along the Santa Ana and San Diego Rivers, *Abrams;* Imperial Valley; desert rim of the Antelope Valley.

3. **S. laevigata** Bebb. Frequent along the valley and foothill streams.

4. **S. lasiolepis** Benth. This is the common willow of the valleys.

5. **S. Watsoni** (Bebb.) Rydb. Tahquitz Creek, San Jacinto Mt.; Snow Canyon, San Bernardino Mts., *Parish.*

6. **S. Scouleriana crassijulis** Schneider. (S. Flavescens Nutt.) Frequent in Bear Valley and in the San Bernardino Mts.

7. **S. glaucops** Anderss. Dollar Lake Canyon, *Abrams.*

8. **S. exigua** Nutt. Frequent in the lower zones of the San Bernardino mountains, *Parish;* Imperial Valley, *Abrams.*

9. **S. argophylla** Nutt. Common along dry washes in the interior valleys.

2. POPULUS. POPLAR. COTTONWOOD.

Trees with rough bark, scaly resinous buds and caducous sepals; leaves somewhat long petioled, coriaceous; flowers in pendulous catkins, appearing before the leaves; stigmas 2-4, sometimes dilated; seeds with a conspicuous white coma (the cotton).

Petioles terete; ovary tomentose.................. 1. *P. trichocarpa.*
Petioles flattened; ovary glabrous.
  Leaves coarsely serrate-dentate.
    Leaves deltoid, cordate at base.................. 2. *P. Fremonti.*
    Leaves twice as broad as high, truncate at base.. 3. *P. Macdougallii.*
  Leaves finely crenate-serrate..................... 4. *P. tremuloides.*

1. **P. trichocarpa** Torr. Black Poplar. Frequent along streams in the coast ranges; San Bernardino Mts.

2. **P. Fremonti** Wats. The common species of the interior valleys.

3. **P. Macdougallii** Rose. Delta Cottonwood. Imperial Valley and the Colorado delta.

4. **P. tremuloides** Michx. Fish Creek Canyon, San Gorgonio Mt., *Grinnell.*

ORDER JUGLANDALES.

JUGLANDACEAE. Walnut Family.

Deciduous trees with large pinnately compound leaves and monoecious flowers, the sterile flowers in catkins, the fertile solitary or few together in short spikes; ovary 1-3-celled, inferior; fruit an indehiscent nut with a fibrous husk.

1. JUGLANS. Walnut.

Characters of the family.

1. **J. californica** Wats. California Black Walnut. Common in the coast ranges from Ventura to Orange Co., less common in the San Bernardino district.

ORDER FAGALES.

Staminate and pistillate flowers in aments.
  Aments axillary and terminal; fruit a winged or angled nutlet .... 1. Betulaceae.
  Aments sessile, axillary; fruit a drupe-like, waxy nutlet .... 2. Myricaceae.
Staminate flowers in aments, the pistillate often solitary; fruit with a bur or cup.......... 3. Fagaceae.

1. BETULACEAE. Birch Family.

Monoecious or rarely dioecious trees or shrubs with alternate simple leaves and deciduous stipules; sterile flowers in catkins; fertile flowers clustered, spicate or in scaly catkins; fruit a 1-celled and 1-seeded nut with or without a foliaceous involucre.

1. ALNUS. Alder.

Ours monoecious, deciduous trees with alternate, simple, doubly toothed leaves; bracts of staminate ament peltate, including 5 bractlets and about 3 flowers; perianth regular, 4-lobed; stamens 2-4; bracts of pistillate ament including 4 bractlets and 2 flowers, slightly 4-lobed; nutlets seed-like.

1. **A. rhombifolia** Nutt. Common on mountain and coastal streams from Santa Barbara to the Cuyamaca Mts.

2. MYRICACEAE. Bayberry Family.

Shrubs or small trees with alternate resinous-dotted and fragrant serrate leaves without stipules; flowers (in ours monoecious) solitary and sessile in the axils of scaly bracts; perianth none; staminate flower with 4-16 stamens, the bractlets usually 2; pistillate flower with 2 or 4 small bractlets at the base; ovary 1-celled, 1-ovuled; stigmas 2, filiform sessile; fruit a small nutlet.

1. MYRICA. Wax Myrtle.

Characters of the family.

1. **M. californica** Cham. Rustic Canyon, Santa Monica. June-July.

3. FAGACEAE. Beech Family.

Trees or shrubs with alternate, deciduous or evergreen leaves of various forms and texture; petals none; the staminate flowers usually in slender aments, the pistillate solitary or in few-flowered aments; fruit a nut borne singly in a scaly cup or 1 or 3 in a spiny bur.

Fruit an acorn.
  Scales of the acorn cup slender, spreading........ 1. Pasania.
  Scales of the acorn cup appressed................ 2. Quercus.
Fruit a spiny bur................................ 3. Castanopsis.

1. PASANIA. Tan Oak. Chestnut Oak.

A tall tree connecting the oaks and the chestnuts; leaves densely whitish with parallel lateral nerves and serrate margins; catkins erect, all with staminate flowers; acorns maturing the second year, cup almost flat, scales slender spreading.

1. **P. densiflora** H. & A. Santa Inez Mts.; slopes of Mt. Frazier.

2. QUERCUS. Oak.

Trees or shrubs with deciduous or evergreen leaves; staminate aments loosely flowered; stamens 5-12; fruit (acorn) a 1-seeded nut enclosed at base by a cup formed by the united bracts of the involucre.

Leaves deciduous, more or less deeply lobed.
  Nut tomentose within.
    Leaves deeply lobed, the lobes bristle tipped.... 1. *Q. Kelloggii.*
  Nut glabrous within.
    Leaves dark green above, deeply lobed.......... 2. *Q. lobata.*
    Leaves blue-green above, shallowly lobed........ 3. *Q. Douglasii.*
Leaves evergreen.
  Trees.
    Nut glabrous within, acorns developing the first year.
      Leaves spinose toothed...................... 4. *Q. agrifolia.*

Leaves entire or shallowly lobed.............. 5. *Q. Engelmanni.*

Nut tomentose within, acorns developing the second year.

Leaves entire or spinose toothed; acorns rounded at the apex........................ 6. *Q. chrysolepis.*

Leaves coarsely spinose-dentate; acorns pointed at the apex.......................... 7. *Q. Dunnii.*

Leaves dentate, strongly ribbed; acorn scales densely tomentose .... 8. *Q. tomentella.*

Leaves spinose-dentate, small; low tree or shrub .... 9. *Q. Wislizeni.*

Shrubs.

Leaves glabrous or nearly so above, usually sinuate spinose; twigs rusty-pubescent.

Cup saucer-shaped, scales thick...............10. *Q. dumosa.*

Cup turbinate, scales thin....................11. *Q. turbinella.*

Leaves pubescent above, coarsely serrate; twigs greyish, pubescent ....12. *Q. Alvordiana.*

1. **Q. Kelloggii** Newb. Black Oak. Extending through the Transition Zone on the desert slopes of the San Gabriel, San Bernardino and San Jacinto ranges; Cuyamaca Mts. *Q. morehus* Kell, apparently a hybrid between this species and *Q. Wislizeni,* is reported by *Abrams* from near Swartout Canyon and from Mill Creek, San Bernardino Mts.; near Seven Oaks.

2. **Q. lobata** Nee. Valley Oak. From San Fernando Valley north through Newhall to Antelope Valley and Big Rock Creek.

3. **Q. Douglasi** H. & A. Blue Oak. Frequent in the Tehachapi Mts., and extending west to Tejon Pass and the Liebre Mts.

4. **Q. agrifolia** Nee. Coast Live Oak. The common species of the coast ranges.

5. **Q. Engelmannii** Greene. Mesa Oak. Ranges on the mesas south from Santa Anita through San Diego Co.

6. **Q. chrysolepis** Liebm. Canyon Oak. Common on the San Gabriel Mts., in the lower Transition Zone; less frequent in the San Bernardino and Cuyamaca Mts.

7. **Q. Dunnii** Kell. Jacumba Hot Springs; Vandeventer's Ranch, San Jacinto Mts., *Jepson.*

8. **Q. tomentella** Engelm. Island Oak. San Clemente and Catalina Islands.

9. **Q. Wislizeni** A. DC. Common in the lower slopes of the desert ranges; occasional in the Ventura coast mountains; San Diego Co.

10. **Q. dumosa** Nutt. Scrub Oak. The common oak of the chaparral belt, most abundant in the coast ranges, less so in the interior.

11. **Q. turbinella** Greene. Campo, *Abrams;* Frazer Mt., *Jepson.*

12. **Q. Alvordiana** Eastw. Mt. Pinos and Oriflamme Canyon, Cuyamaca Mts., *Abrams.*

3. CASTANOPSIS. Chinquapin.

Ours a shrub with oblong, obtuse, yellowish leaves, densely scurfy beneath; staminate flowers in clusters of 3; pistillate 1-3 in an involucre; stamens 10-12; nuts angular, enclosed in a spiny bur.

1. **C. sempervirens** Kell. Common at 2,200 m. in the San Bernardino Mts.; occasional in the San Gabriel Mts.

ORDER URTICALES.

Fruit a samara or drupe, sometimes nutlike......... 1. Ulmaceae.
Fruit an achene; style or stigma 1.................. 2. Urticaceae.

1. ULMACEAE. Elm Family.

Trees or shrubs with simple, alternate serrate leaves and small (in ours monoecious) flowers, with 3-9-parted perianth; petals none; stamens as many as the perianth lobes; ovary superior, 1-celled; styles 2; fruit a samara drupe or nut.

1. CELTIS. Hackberry.

A small tree with ovate, abruptly acuminate, reticulate, cordate leaves, very unequal at the base; flowers greenish, axillary, the fertile solitary or in pairs; calyx 5- or 6-parted; stamens 5 or 6; ovary single-celled with a single ovule.

1. **C. Douglasii** Planch. Laguna mountain, San Diego Co., *Cleveland.*

2. URTICACEAE. Nettle Family.

Annual or perennial herbs, mostly with simple leaves and small, greenish, unisexual, clustered flowers; calyx 2-5-cleft or sepals distinct; petals none; stamens in staminate flowers as many as the sepals; fruit an achene.

Herbs with stinging hairs, leaves opposite, toothed; achenes flattened.
  Plant tall, coarse; pistillate calyx 4-parted......... 1. Urtica.
  Plant low, slender; pistillate calyx saccate, 2-4-toothed at the apex..................... 2. Hesperocnide.
Herbs without stinging hairs, leaves alternate, entire; achene ovoid..................... 3. Parietaria.

1. URTICA. Nettle.

Annual or perennial, armed with stinging hairs; leaves petioled, opposite and coarsely toothed; flowers axillary, small and numerous; staminate flowers 4-merous; pistillate calyx with unequal sepals; stigma sessile, tufted; achenes flattened.

Annual; inflorescence of mixed staminate and pistillate flowers .... 1. *U. urens.*
Perennial; inflorescence unisexual................. 2. *U. holosericea.*

1. **U. urens** L. Little Nettle. In gardens and waste grounds, but not common.

2. **U. holosericea** Nutt. Common Nettle. Common along streams in low grounds and in the lower mountain valleys. June-July.

2. HESPEROCNIDE.

An annual closely resembling *Urtica urens,* but distinguished from it by the pistillate perianth which is a membranous flattened oblong-ovate sac with a minutely 2-4-toothed orifice.

1. **H. tenella** Torr. Not infrequent in shady nooks of the Coast Ranges, and occasional in the interior. April-May.

3. PARIETARIA. Pellitory.

Prostrate annuals with thin, alternate, entire, 3-nerved leaves; inflorescence of axillary clusters subtended by an involucre of leafy bracts; achenes terete.

1. **P. debilis** Forst. Common in moist, shady places in the Coast Range from Santa Barbara to San Diego; less common in the lower canyons of the San Gabriel and San Bernardino Mts. May.

ORDER SANTALES.

LORANTHACEAE. Mistletoe Family.

Evergreen plants parasitic on shrubs and trees, branches dichotomous, the joints swollen; leaves opposite, thick, entire, often reduced to connate scales; flowers small and inconspicuous, greenish, dioecious; sepals 2-5; stamens of the same number and inserted on the sepals; ovary inferior, 1-celled; fruit a berry.

Berry sessile, globose, pulpy, semi-transparent; anthers 2-celled; leaves usually large and foliaceous....................... 1. Phoradendron.
Berry on a recurved pedicel, compressed, fleshy, opaque; anthers 1-celled; leaves scale-like and connate...................... 2. Arceuthobium.

1. PHORADENDRON.

Plants parasitic on trees and shrubs, stems brittle, much branched; leaves entire, thick and firm or reduced to scales; flowers small in the joints of axillary spikes; calyx usually 3-parted; fruit a berry crowned by the persistent sepals.

- Leaves represented by short thin scales, 2 mm. long or less.
  - Canescent; spikes several jointed; sepals meeting in fruit .... 1. *P. californicum.*
  - Glabrous; spikes 1-jointed; sepals usually parted in fruit.
    - Scales half-ovate, 1 mm. long, obscurely constricted at base....................... 2. *P. libocedri.*
    - Scales half-round, sharply constricted at base.... 3. *P. ligatum.*
- Leaves foliaceous.
  - Leaves sessile.
    - Leaves oblanceolate, more than 15 mm. long; staminate spike about 12-flowered...... 4. *P. densum.*
    - Leaves elliptical, 20-30 mm. long; staminate spike 8-flowered .... 5. *P. pauciflorum.*
  - Leaves petioled.
    - Fruit glabrous.
      - Spikes glabrous; leaves oblanceolate, 3-6 cm. long .... 6. *P. coloradense.*
      - Spikes short-villous; leaves oblanceolate, 4-6 cm. long .... 7. *P. longispicum.*
    - Fruit short-villous at top; leaves oblanceolate-obovate, 3-4 cm. long.................. 8. *P. villosum.*

1. **P. californicum** distans Trelease. Usually parasitic on mesquite. Indian Wells; Tantillas Canyon, *Trelease.*

2. **P. libocedri** Howell. San Bernardino; San Jacinto and Cuyamaca Mts., on *Libocedrus decurrens.*

3. **P. ligatum** Trel. San Bernardino Mts., on *Juniperus occidentalis.*

4. **P. densum** Torr. Parasitic on *Juniperus californicus.*

5. **P. pauciflorum** Torr. San Bernardino; San Jacinto and Cuyamaca Mts., on *Abies.*

6. **P. coloradense** Trel. Banks of the Colorado; Yuma; Needles, on mesquite.

7. **P. longispicum** Trel. Common on sycamore, alder, willow and other deciduous trees.

8. **P. villosum** Nutt. Frequent from Santa Barbara to Lower California, chiefly on oaks.

Var. *rotundifolium* Trel. Leaves smaller and nearly orbicular, Santa Barbara; Cajon Pass, *Trelease.*

2. ARCEUTHOBIUM.

Stout branched brownish plants parasitic on the *Pinaceae;* branches 4-angled, glabrous; leaves scale-like; fruit a compressed berry.

Stems more than 10 cm. long; staminate plants yellow, pistillate brown; berries more than 4 mm. long.................. 1. *A. campylopodium.*
Stems less than 10 cm. long; staminate and pistillate plants of nearly equal color; berries less than 4 mm. long....... 2. *A. divaricatum.*

1. **A. campylopodium** Engelm. San Bernardino and San Jacinto Mts., on various species of pines.

2. **A. divaricatum** Engelm. Providence Mts.; San Bernardino Mts., on the piñon pine.

ORDER POLYGONALES.

POLYGONACEAE. Buckwheat Family.

Herbaceous annuals or perennials with alternate or sometimes opposite or verticillate leaves, the stipules forming a sheath or wanting; inflorescence varied; flowers small, mostly perfect; perianth of 2-6 segments, the inner ones sometimes petaloid; stamens 2-9; pistil solitary; fruit a lenticular or angled achene.

Flowers without involucres, sheaths present.
  Stigmas capitate.
    Leaf-blades jointed at the base; inner filaments dilated .... 1. Polygonum.
    Leaf-blades not jointed at the base.
      Sheaths cylindric, truncate................... 2. Persicaria.
      Sheaths oblique, split on one side.
        Stems simple; leaves oblong, basal......... 3. Bistorta.
        Stems twining, leaves cordate or hastate... 4. Bilderdykia.
  Stigmas tufted.
    Leaves orbicular reniform; sepals 4............ 5. Oxyria.
    Leaves elongate or hastate; sepals 6............ 6. Rumex.
Flowers without involucres; leaves linear fragile.... 7. Lastarrieae.
Flowers with involucres bract-like enlarged in fruit; leaves fan-shaped, opposite............ 8. Pterostegia.
Flowers clustered, subtended by woolly bracts; leaves mostly basal .... 9. Nemacaulis.
Flowers subtended by an involucre.
  Involucre 4-8-toothed, teeth not awned; stamens 9.10. Eriogonum.
  Involucres 5-6-toothed, teeth mostly with recurved spines; stamens 3, 6, or 9..............11. Chorizanthe.
  Involucres 4-5-toothed, teeth with straight bristles..12. Oxytheca.

1. POLYGONUM. Knotweed.

Perennial herbs with slender stems branching from the base; leaves alternate, lanceolate, entire, with entire or lacerate sheaths:

flowers mostly axillary; calyx greenish with white or pink margins; stamens 4-8, the inner with dilated filaments; achenes triangular.

Flowers in dense terminal spikes; plants small, less than 10 cm. high.............. 1. *P. Watsoni.*
Flowers in scattered axillary clusters; stems more than 10 cm. high.
  Stems prostrate, leaves thin, bright green; sheaths not conspicuous............ 2. *P. aviculare.*
  Stems erect.
    Upper bracts elliptic; pedicels not deflexed; achenes dull .... 3. *P. ramosissimum.*
    Upper bracts small subulate; pedicels deflexed; branches few............... 4. *P. Douglasii.*

1. **P. Watsoni** Small. Moist grounds, Bear Valley; San Jacinto Mt., *Hall.* July.

2. **P. aviculare** L. Common on beaten paths and street borders. June-Nov.

3. **P. ramosissimum** Michx. Pasadena Streets, *Grant.*

4. **P. Douglasii** Greene. Common in the Transition Zone in the San Bernardino and San Jacinto Mts. July-Aug.

2. PERSICARIA. SMARTWEED.

Annual or perennial herbs with the general characters of *Polygonum* but with the sheaths naked or fringed with bristles and flowers in terminal or axillary spike-like racemes.

Flower spikes terminal only, usually solitary.
  Leaves elliptic; spikes 12-24 mm. long; pedicels glabrous .... 1. *P. amphibia.*
Flower spikes several, axillary and terminal.
  Sheaths without marginal bristles; sepals white or flesh colored.................... 2. *P. lapathifolia.*
  Sheaths with marginal bristles.
    Perianth white or rose colored, not punctate.
      Internodes strongly swollen above the [illegible] .... [illegible]
      Internodes not swollen.
        Perennial; spikes slender interrupted; stamens 8......................... 4. *P. hydropiperoides*
    Perianth greenish, glandular dotted; perennial 5. *P. acre.*

1. **P. amphibia** Gray. Ponds and marshes, Bear Valley. July-Sept.

2. **P. lapathifolia** Gray. Frequent along ditches and in moist grounds. June-Sept.

3. * **P. fusiforme** Greene. Colorado River near Needles, type locality.

4. **P. hydropiperoides** Michx. Occasional along streams; Puente; San Gabriel and Los Angeles Rivers; San Bernardino, *Parish.* June-Sept.

5. **P. acre** H. B. K. Witch Creek, San Diego Co., *Jepson.*

3. BISTORTA. Bistort.

Glabrous perennial subalpine herbs with long leaves oblong at base, much reduced above; sheaths never ciliate; flowers in a single dense terminal raceme; stamens 8 or 9.

1. **B. bistortoides** Small. In bogs and wet meadows Canadian and Transition Zones, San Bernardino and San Jacinto Mts. July-Aug.

4. BILDERDYKIA. Black Bindweed.

Twining annuals with hastate or cordate leaves and flowers in axillary, interrupted or compound racemes; stamens 8.

1. **B. convolvulus** Dum. Fields at Pasadena; casual on Los Angeles streets. 1894.

5. OXYRIA. Mountain Sorrel.

Low perennial alpine herbs with long petioled, round-reniform mostly radical leaves and small, obliquely truncate, scarious sheaths; flowers small and greenish in narrowly panicled racemes; sepals 4, unchanged in fruit; stamens 6; fruit surrounded by a broad wing.

1. **O. digyna** Hill. Summit of Mt. San Jacinto.

6. RUMEX. Dock. Sorrel.

Coarse herbs with leaves mostly basal and stipules united to form more or less hyaline sheaths; flowers small, greenish, dioecious or perfect, crowded in whorls along the branches of the panicle; calyx of 6 sepals, the inner 3 becoming enlarged in fruit and frequently bearing callous grains on the back; stamens 6; achenes triangular.

Flowers dioecious; callosities none; leaves hastate. 1. *R. acetosella.*
Flowers perfect; leaves not hastate.
  Inner fruiting sepals with slender awned teeth.
    Annual, sepals with 4-8 teeth on each side, some grain bearing................ 2. *R. pulcher.*
    Perennial; sepals with 2 or 3 teeth on each side, all grain bearing............. 3. *R. persicarioides.*
  Inner fruiting sepals entire or nearly so; perennials.
    Sepals without callous grains, leaves oblong; panicle dense; sepals ovate 8-12 mm. long .... 4. *R. hymenosepalus.*

- Sepals with callous grains.
  - Leaves oblong-lanceolate, wavy margined; pedicels twice the length of the fruit. 5. *R. crispus.*
  - Leaves oblong undulate; pedicels shorter than the fruit.................... 6. *R. conglomeratus.*
  - Leaves lanceolate flat, short petioled; pedicels shorter than the fruit......... 7. *R. salicifolius.*
  - Leaves linear or narrowly oblong; sepals erose or 2-4-toothed at the base..... 8. *R. Berlandieri.*

1. **R. acetosella** L. Sheep Sorrel. Occasional on waysides, Los Angeles and Pasadena. 1890.

2. **R. pulcher** L. Fiddle Dock. Muddy margins of Nigger Slough; Inglewood. 1904.

3. **R. persicarioides** L. Golden Dock. Nigger Slough, Los Angeles. 1904.

4. **R. hymenosepalus** Torr. Canaigre. Common on sandy plains in the counties of San Bernardino, Los Angeles and Orange. April-June.

5. **R. crispus** L. Curly Dock. Well established in moist lands. Native of Europe.

6. **R. conglomeratus** L. Frequent on damp lands near the coast in Orange and Los Angeles Co's. Native of Europe.

7. **R. salicifolius** Weinm. Willow Dock. Common in wet places in the mountains even to high altitudes, becoming rare in the valleys from the intrusion of the introduced species.

8. **R. Berlandieri** Mesin. Colorado Desert.

7. LASTARRIAEA.

A low or prostrate diffusely branched annual with fragile stems and linear leaves crowded at the base and in whorls on the stems; flowers sessile; perianth involucre-like, 5-6-cleft; stamens 3.

1. **L. chilense** Remy. Common along the shore in dry sands and in dry soils in the interior coastal plains. May-June.

8. PTEROSTEGIA.

Very slender weak, leafy annual with opposite fan-shaped leaves, crenately lobed; flowers yellowish, sessile, solitary; bracts lobed, the margins toothed.

1. **P. drymarioides** F. & M. In shady nooks or rocky cover, both in the foothills and mountains. April-June.

9. NEMACAULIS.

Slender annual with spatulate, white-woolly mostly basal leaves and no stipules; stems sparingly and divaricately branched with very small flowers in crowded, sessile, subglobose clusters in the axils and along the naked stems; calyx 6-cleft; stamens 3.

1. **N. denudata** Nutt. Sea beaches and river sands from Los Angeles to San Diego, the type locality; Palm Springs district in the Colorado Desert. May-July.

10. ERIOGONUM.

Annuals or perennials, herbaceous or somewhat woody at the base; leaves entire, mostly basal; inflorescence various; flowers involucrate, involucres 4-8-toothed or lobed, mostly many flowered; calyx with 6 divisions, colored, corolla-like; stamens 9, achenes triangular, sometimes winged.

Involucres nerveless, 4- or 5-toothed or lobed.
Leaves in basal rosettes and in sessile pairs in all the axils.
Basal leaves oblong-lanceolate, undulate, petioled; flowers rose-red.............. 1. *E. angulosum.*
Basal leaves oblanceolate, sessile or subsessile; flowers yellowish red.......... 2. *E. gracillimum.*
Leaves in basal rosettes and in the lower axils only; involucre 4-toothed..........
Leaves linear, oblanceolate, hairy; flowers white with pink midvein............ 3. *E. sperqulinum.*
Leaves obovate, glabrate, petioled; flowers pinkish, densely pubescent......... 4. *E. Ordii.*
Leaves in basal rosettes only.
Involucres 4-lobed or toothed.
Leaves sessile or narrowed to a petiole.
Leaves spatulate, sessile, glabrous with ciliate margins; calyx hispid with hooked hairs .... 5. *E. inerme.*
Leaves obovate, glandular-hirsute, narrowed to the base; calyx white, puberulent, 3-toothed at the apex...... 6. *E. apiculatum.*
Leaves petioled.
Leaves oblanceolate, hirsute; stem viscid below; calyx slightly puberulent, pinkish .... 7. *E. Parishii.*
Leaves roundish or cordate, hirsute-pubescent; stems glabrous, frequently inflated; flowers yellow............. 8. *E. trichopes.*
Involucres 5-toothed.
Flowers distinctly pedicelled. 9. *E. inflatum.*
Leaves green on both sides, petioled; stems usually much inflated; flowers yellow; calyx pubescent ....
Leaves white-wooly beneath, petioled.
Calyx pubescent.
Leaves obovate; involucres glandular; flowers yellow with red spots.......10. *E. pusillum.*

Leaves reniform; internodes hairy; involucres not glandular; flowers yellow .... 11. *E. reniforme.*

Leaves roundish: flowers yellow; calyx in age much dilated below............. 12. *E. Thomasii.*

Calyx glabrous.

Leaves ovate, crinkled; flowers rose red; pedicels erect .... 13. *E. Thurberi.*

Leaves ovate; flowers white; pedicels deflexed .... 14. *E. cernuum.*

Leaves round-cordate; stems slightly inflated; pedicels horizontal or slightly reflexed .... 15. *E. Watsonii.*

Flowers sessile or very short pedicelled; flowers rose colored.

Leaves orbicular, densely tomentose on both sides; stems glandular; plants procumbent, straggling .... 16. *E. brachypodum.*

Leaves cordate; stems glabrous; plant erect.... 17. *E. deflexum.*

Involucres 5-6-nerved and 5-toothed, sessile.

Annual; involucres solitary.

Plants tomentose throughout.

Leaves ovate or subcordate; branches many, intricately interwoven; outer calyx segments fan-shaped .... 18. *E. nidularium.*

Leaves oblong or oblanceolate, attenuate to a long petiole; stems elongated; flowers yellowish; involucral teeth [illegible] .... 19. *E. gracile.*

Leaves lanceolate, petioles short; stems few erect; flowers yellow; involucral teeth [illegible] .... 20. *E. virgatum.*

Plant glabrous; leaves roundish to cordate, white woolly beneath.

Stems erect, simply forking at the nodes; flowers white; involucres 5 mm. long. 21. *E. molestum.*

Stems erect, 3 or more branches from the nodes; involucre 3 mm. long; bracts united .... 22. *E. Davidsonii.*

Stems erect, usually branching from the base; flowers rose red; involucre 3 mm. long, angled.................. 23. *E. vimineum.*

Stems branching above; flowers yellowish; involucre not angled.............. 24. *E. Baileyi.*

Stems dichotomously branched; flowers yellow, very small, 1 mm. long........ 25. *E. mohavense.*

Stems dichotomously branched very slender, yellowish; flowers yellow; achenes exserted .... 26. *E. delicatulum.*

Plant tomentose below, glabrous above.

Stems short; plant umbrella shaped, branches closely interlacing; involucres minute....................... 27. *E. brachyanthum.*

- Involucres solitary.
    - Perennial.
        - Stems and leaves tomentose.
            - Stems with leaves crowded near the base; leaves white tomentose on both surfaces.
                - Leaves round, ovate, silvery white beneath, petioled; flowers white or roseate .... 28. *E. saxatile.*
                - Leaves obovate or oblanceolate, tapering to a petiole, white tomentose beneath, less so above; flowers white.. 29. *E. Wrightii.*
                - Leaves elliptic, white tomentose beneath, glabrate above; flowers in umbels, yellow .... 30. *E. microthecum.*
            - Stems leafy to the lowest fork; leaves white tomentose beneath.
                - Leaves ovate, glabrate above, petioled; stems elongated; involucres few and large .... 31. *E. elongatum.*
                - Leaves elliptic, lightly tomentose above; stems white with a dense tomentum; flowers yellowish .... 32. *E. plumatella.*
        - Stems glabrous above, slightly tomentose near base.
            - Leaves elliptic, crenulate, slightly tomentose beneath, glabrate above, leaves scattered on the lower stems; branches rigid, spinescent .... 33. *E. Heermannii.*
- Involucres, 2 or more in heads.
    - Shrubs 8 dm. or more high; inflorescence of large, compound cymes.
        - Leaves ovate 5 cm. long, white woolly beneath, glabrate above, conspicuously veined .... 34. *E. giganteum.*
        - Leaves linear revolute, 2-3 cm. long, white tomentose beneath, glabrate above.. 35. *E. arborescens.*
    - Undershrubs or woody based plants usually less than 8 dm. high.
        - Leaves fascicled, ovate or roundish, subcordate, densely white tomentose beneath, dark green and glabrate above; flowers scattered and in terminal heads .... 36. *E. parvifolium.*
        - Leaves ovate or elliptic, cuneate at base, lightly tomentose beneath, puberulent and light green above; flowers mostly in terminal heads............... 37. *E. cinereum.*
        - Leaves linear or oblanceolate, revolute, white tomentose beneath; flowers glabrous in heads or umbels................ 38. *E. fasiculatum.*

Herbaceous perennials, leafy only at base.
  Stems tall, stout, branched; leaves 2-7 cm. long, undulate, densely white tomentose beneath.
    Heads large and dense, few; peduncles not fistulous ....39. *E. latifolium.*
    Heads more numerous; peduncles fistulous. 40. *E. nudum.*
  Stems short from a caespitose base; flowers in terminal solitary heads.
    Leaves narrowly oblong, white wooly, 6-8 mm. long; flowers white, veined with red ....41. *E. Kennedyi.*
    Leaves oblanceolate tomentose, 2-6 mm. long, short petioled; flowers dark red or white, its segments unequal......42. *E. vineum.*
Involucres 4-8-toothed or lobed; flowers in umbels.
  Flowers yellow in simple umbels bracted at their base; leaves ovate, petioled, 1-2 cm. long ....43. *E. umbellatum.*

1. **E. angulosum** Benth. Very common on the Mohave Desert; coast ranges Ventura Co. June-Sept.

Var. *maculatum* Heller. Basal leaves not revolute; outer calyx segments red blotched. Mohave Desert. July.

2. **E. gracillimum** Wats. Mohave Desert.

3. **E. spergulinum** Gray. Mt. Pinos, *Hall.*

4. **E. Ordii** Wats. Colorado Desert, rare.

5. **E. inerme** Jepson. Lower Transition Zone, San Bernardino Mts., *Parish;* Tehachapi Mts. July-Aug.

6. **E. apiculatum** Wats. Mt. San Jacinto, 2,500 meters, *Hall;* Cuyamaca Mt., *Purpus.*

7. **E. Parishii** Wats. Common in the Upper Transition Zone, San Bernardino Mts.; Bear Valley type locality. July-Aug.

8. **E. trichopes cordatum** Gray. Frequent on the desert near Haiwee and in Kern Co.; less common in the southern Mohave; Thermal, Colorado Desert. April-May.

9. **E. inflatum** T. & F. Common in the Colorado and Mohave Desert and locally known as the "cigarette plant," its inflated stems making convenient cigarette holders.

10. **E. pusillum** T. & G. Common on the southern borders of the Mohave Desert. June-July.

11. **E. reniforme** T. & G. Kern Co., and the northern border of the Mohave Desert; Twenty-nine Palms, Colorado Desert, *Brandegee.* May.

12. **E. Thomasii** Torr. Colorado Desert.

13. **E. Thurberi** Torr. River sands in the valleys throughout the south; occasional in the mountains; Colorado Desert. April-Aug.

14. **E. cernum** Nutt. Warren's Well, Colorado Desert, *Jepson.*

15. **E. Watsonii** T. & G. Haiwee, Kern Co., probably within our borders also. May.

16. **E. brachypodum** T. & G. Little Rock Creek, Mohave Desert. July-Aug.

17. **E. deflexum** Torr. Mohave and Colorado Deserts, not common.

18. **E. nidularium** Cov. Victor; Barstow and district, *Jepson.*

19. **E. gracile** Benth. A common species of the foothills and adjacent plains.

Var. *leucocladon* T. & G. Taller and stouter, with glabrous branches. Frequent on the foothill plains of the Santa Monica and San Gabriel Mts. July-Aug.

Var. *acetoselloides* T. & G. Plant depressed, branches reflexed, glabrous. Big Rock Creek, Mohave Desert.

20. **E. virgatum** Benth. Griffin, Ventura Co., *Jepson.*

21. **E. molestum** Wats. Limited to the high montane regions. July-Aug.

22. **E. Davidsonii** Greene. Ranging lower than the last on the mountains; foothills of the Santa Monica Range. Wilson's Peak, type locality.

23. **E. vimineum** Dougl. Frequent in the coast foothills and occasionally in the mountains, the latest flowering species. Aug.-Sept.

Var. *aviculare* Heller. Stouter and few flowered and seemingly quite distinct in appearance . Mohave Desert, July-Aug.

24. **E. Baileyi** Wats. Chalk Hill, Mt. San Jacinto, *Hall;* Bear Valley; Mohave Desert, *Jepson.* July-Aug.

25. **E. mohavense** Wats. Frequent on the Mohave Desert. July.

26. **E. delicatulum** Wats. Harold, Mohave Desert.

27. **E. brachyanthum** Cov. Rock Creek; Victor and the northern border of the Mohave Desert. July-Aug.

28. **E. saxatile** Wats. On all our mountains at from 1500-1800 meters. June-Aug.

Var. *Stokesiana* Jones. Plant more flexile; leaves longer;

flowers yellow. Mountains at Big Rock Creek; San Bernardino Mts., *Parish.*

29. **E. Wrightii subscaposum** Wats. Frequent in the Upper Transition and Canadian Zones in the San Gabriel; San Bernardino and San Jacinto Mts. July.

Var. *membranaceum* Stokes. Petioles dilated into a sheath clasping the stem. Mountains of San Jacinto and Cuyaimaca, *Jepson.*

30. **E. microthecum** Nutt. Bear Valley; Cucamonga Peak and Baldy Mt., *Johnston.* Rare and local. July-Aug.

31. **E. elongatum** Benth. Common at low and middle elevations in all our mountains. Aug.-Sept.

32. **E. plumatella** D. & H. Big Rock Creek, Mohave Desert; Palm Springs, Colorado Desert.

33. **E. Heermannii** D. & H. Mohave Desert, not common. July.

34. **E. giganteum** Wats. Common in the Channel Islands; Catalina, type locality. June-Sept.

35. **E. arborescens** Greene. Santa Barbara and Santa Cruz Islands.

36. **E. parvifolium** Smith. Common on the bluffs and sand dunes along the whole coast. July-Sept.

37. **E. cinereum** Benth. With the last but limited to the coast from San Pedro to Santa Barbara.

38. **E. fasciculatum** Benth. Wild Buckwheat. Abundant near the sea coast.

Var. *foliolosum* Stokes. Leaves more strongly revolute; calyx slightly hairy outside. The common form in the interior.

Var. *polifolium* T. & G. Leaves much larger, flat; calyx conspicuously hairy outside. Mountain slopes bordering the Mohave and Colorado Deserts.

39. **E. latifolium grande** Greene. Islands of Catalina and Santa Cruz.

40. **E. nudum pauciflorum** Wats. Frequent on canyon slopes in the mountains. July-Aug. Typical *E. nudum* grows at Little Lake, Inyo Co., but has not been recorded within our limits.

41. **E. Kennedyi** Porter. Common at Bear Valley; Mt. Pinos, *Hall.* July-Aug.

42. **E. vineum** Small. Rose Mine, San Bernardino Mts., type locality.

43. **E. umbellatum stellatum** Jones. Transition Zone, San Gabriel; San Antonio and San Bernardino Mts.

Var. *bahiaeforme* Jepson. Stems more lax and inflorescence more branched. Big Rock Creek; Tehachapi Mts.

Var. *minus* Johnston. A dwarf form with dark red and yellowish flowers. Mt. San Antonio. July-Aug.

11. CHORIZANTHE.

Low dichotomus annuals with few mostly basal leaves; branches with ternate bracts at the nodes; involucres 1-3-flowered, tubular and coriaceous, corrugated or 3-6-angled or ribbed with 3 or 6 teeth, the latter in 3 equal or unequal sets of 3; flowers 6-parted; stamens 3-9.

Bracts 3-lobed or perfoliate.
  Bracts perfoliate, slightly angular, angles spine tipped .... 1. *C. perfoliata.*
  Bracts unilateral, 3-lobed.
    Involucre without spurs, teeth 4.............. 2. *C. Californica.*
    Involucre 6-spurred, spurs spine-like........... 3. *C. leptoceras.*
    Involucre 3-spurred, spurs saccate............ 4. *C. Thurberi.*
Bracts entire.
  Leaves white tomentose or woolly beneath.
    Involucral tube 3-angled; plant forming a spiny mat.
      Calyx yellow; involucral teeth 3, very unequal 5. *C. rigida.*
    Involucre cylindrical not ribbed; plant matted.
      Calyx white; involucral lobes 3, woolly above. 6. *C. corrugata.*
    Involucral tube 6-ribbed; inflorescence in terminal clusters.
      Herbage reddish; flowers rose-pink........... 7. *C. staticoides.*
      Herbage greenish; flowers white.............. 8. *C. nudicaule.*
  Leaves not tomentose beneath.
    Involucral tube 6-ribbed.
      Calyx white, lobes fringed at apex, plant yellowish, fragile .... 9. *C. brevicornu.*
      Calyx white, lobes all fringed; stamens 6.....10. *C. fimbriata.*
      Calyx white, lobes lightly fringed; stamens 9.11. *C. Parryi.*
      Calyx white or yellow; awns recurved; plant procumbent, pubescent ....12. *C. procumbens.*
      Calyx white; awns straight; plant procumbent, silky-pubescent ....13. *C. fernandina.*
      Calyx white; involucre 4-5-ribbed, teeth very unequal ....14. *C. spinosa.*
    Involucral tube 3-angled.
      Calyx white; involucral teeth 3, equal.........15. *C. Orcuttiana.*
    Involucral tube cylindric.
      Calyx yellow; involucral teeth 5, unequal; stems very fragile.....................16. *C. Watsoni.*

1. **C. perfoliata** Gray. Mohave Desert, not common. May-June.

2. **C. californica** Gray. Sandy plains from Santa Barbara to San Diego, not uncommon. May.

3. **C. leptoceras** Wats. Very abundant on the sandy plains from San Fernando to the borders of San Bernardino Co. June.

4. **C. Thurberi** Wats. Frequent on the Mohave Desert and occasional on the adjacent mountains; Colorado Desert, *Jepson.* May-June.

5. **C. rigida** T. & G. Thermal, Colorado Desert; Barstow and neighborhood. May.

6. **C. corrugata** T. & G. Thermal; eastern Mohave Desert, *Jepson.*

7. **C. staticoides** Benth. Common in the foothills in all the southern counties. May-July.

8. **C. nudicaule** Nutt. Foothills from Santa Barbara, type locality, to the hills bordering Los Angeles where it is somewhat rare. June-July.

9. **C. brevicornu** Torr. Colorado and Mohave Deserts, not common. May.

10. **C. fimbriata** Nutt. San Diego Co., San Jacinto Mts., *Hall.* May-July.

Var. *laciniata* (Torr). Calyx rose color, lobes more heavily fringed. San Diego Co.

11. **C. Parryi** Wats. Sandy plains near San Bernardino and Riverside; Santa Monica, *Hasse.*

12. **C. procumbens** Nutt. Generally distributed but not common; San Diego, type locality. May-July.

13. **C. fernandina** Wats. San Fernando Canyon, type locality; Chatsworth, *Abrams.* June.

14. **C. spinosa** Wats. Yucca, Mohave Desert, type and only locality.

15. **C. Orcuttiana** Parry. Point Loma, only locality.

16. **C. Watsoni** T. & G. Mohave Desert. May.

12. OXYTHECA.

Slender dichotomously branched annuals, the internodes more or less covered with stipitate glands, leaves in a basal rosette; bracts more or less connate; involucres mostly pedicellate; flowers few, 4-5-cleft, each lobe bearing a bristle or awn; stamens 9.

Bracts, the upper ones perfoliate; involucres nearly sessile .... 1. *O. perfoliata.*
Bracts united at the base.
Involucres deeply 6-lobed.
Flowers yellow; basal leaves orbicular with long, slender petioles.............. 2. *O. luteola.*
Flowers greenish, calyx lobes entire; plant diffusely branched .... 3. *O. caryophylloides*
Flowers white, calyx lobes cleft; branches few, divaricate .... 4. *O. trilobata.*
Involucres large, with 5 shallow lobes; calyx lobes fimbriate .... 5. *O. emarginata.*
Involucre 4-lobed, awns long; flowers white... 6. *O. Watsoni.*
Involucres margined with many long bristles, not lobed.
Bristles 14-21 .... 7. *O. Parishii.*
Bristles 7-12 .... 8. *O. Abramsii.*

1. **O. perfoliata** T. & G. Mohave Desert on the Kern Co. border. May.

2. **O. luteola** Parry. Not infrequent around Lancaster, the type locality. May.

3. **O. caryophylloides** Parry. Open slopes San Bernardino Mts., type locality. Bear Valley and Deep Creek; San Jacinto Mts.; Baldy Lookout, *Johnston.* June.

4. **O. trilobata** Gray. At an altitude of about 1,350 meters in the San Bernardino (type locality); on San Jacinto and Cuyamaca Mountains it is not unusual but is rare in Los Angeles Co.; Ravenna; Cucamonga Canyon, *Johnston.* May-June.

5. **O. emarginata** Hall. Tahquitz Peak, San Jacinto Mts. Only locality. July.

6. **O. Watsoni** T. & G. Cushenberry Springs, Mohave Desert, *Parish.*

7. **O. Parishii** Parry. San Bernardino Mts., (type locality) and San Gabriel Mts., at 1,500 to 1,800 meters alt., rare in the latter mountains. Aug.-Sept.

8. **O. Abramsii** McGreg. Topa Topa Mts., Ventura Co., type locality.

ORDER CHENOPODIALES.

Fruit a utricle or an anthocarp.
Fruit a utricle; perianth never corolla-like.
Bracts herbaceous or none................. 1. CHENOPODIACEAE.
Bracts dry, never herbaceous............... 2. AMARANTACEAE.
Fruit an anthocarp, the achene surrounded by the tube of the corolla-like calyx... 3. ALLIONACEAE.

Fruit fleshy; ovary 4-celled; petals 4.......... 4. BATIDACEAE.
Fruit a capsule, dehiscent.
Ovary several-celled; corolla wanting......... 5. AIZOACEAE.
Ovary 1-celled; corolla usually present.
Sepals 2 .... 6. PORTULACACEAE.
Sepals 4 or 5.
Sepals distinct; petals not clawed; ovary sessile .... 7. ALSINACEAE.
Sepals united; petals clawed; ovary more or less distinctly stipitate........... 8. CARYOPHYLLACEAE.

1. CHENOPODIACEAE. GOOSEFOOT FAMILY.

Annual or perennial herbs or shrubs; leaves usually simple, alternate, often succulent, mealy or scurfy, sometimes fleshy; flowers perfect or unisexual, small, apetalous, the sepals sometimes wanting; stamens distinct, as many as the sepals and opposite them or fewer; pistils 1, with a single ovule; fruit an achene or utricle.

Embryo annular or conduplicate, partly or wholly surrounding the endosperm.
Leaves opposite, linear, fleshy, united at base... 1. NITROPHILA.
Leaves alternate, the lowest occasionally opposite.
Fruit dehiscent or opening by a lid at germination.
Perianth segments thickened at the base; stamens 5 .... 2. BETA.
Perianth segments not thickened at the base; Stamen 1 .... 3. APHANISMA.
Flowers perfect, or some of them pistillate.
Calyx herbaceous or fleshy in fruit........... 4. CHENOPODIUM.
Calyx in fruit dry, strongly reticulate; leaves pinnatifid .... 5. ROUBIEVA.
Calyx of 1 sepal and 1 stamen................ 6. MONOLEPIS.
Flowers monoecious or dioecious; calyx of pistillate usually absent; fruit enclosed by 2 bracts.
Bracts free at the apex, smooth or muricate.... 7. ATRIPLEX.
Bracts smooth; perianth present in pistillate flowers .... 8. ENDOLEPIS.
Bracts keeled, winged in fruit, pericarp glabrous. 9. GRAYIA.
Bracts not keeled; pericarp silky-pubescent......10. EUROTIA.
Calyx in fruit surrounded by a 5-lobed wing....11. KOCHIA.
Leaves scale-like; stems jointed; fleshy herbs.
Bracts united, the flowers sunk in depressions in the branches.
Seeds glabrous ....12. ARTHROCNEMUM.
Seeds pubescent ....13. SALICORNIA.

Embryo spirally curled, endosperm little or none.
  Shrubs; flowers monoecious, ebracteolate.......14. Sarcobatus.
    Herbs.
      Fruiting calyx wingless; leaves fleshy or linear ....15. Dondia.
      Fruiting calyx winged; leaves spiny........16. Salsola.

1. NITROPHILA.

A low or prostrate perennial herb, with linear, fleshy opposite, amplexicaul leaves, and axillary perfect, 2-bracteolate flowers; calyx 5-parted, segments concave, white or pinkish; stamens 5; stigmas 2; utricle ovoid, the pericarp free from the seed.

1. **N. occidentalis** Wats. In alkaline soils along Los Angeles River; Nigger Slough, and south along the coast to lower California. Also in low grounds in the interior. May.

2. BETA. Beet.

Robust glabrous, biennial, with large, fleshy roots, and alternate leaves, the radical large and long-petioled, the floral reduced and sessile; flowers fascicled in the axils and spicate or congested along the paniculate branches; sepals 5; stamens 5; ovary partly inferior and encircled by the disk-like margin of the receptacle; fruit enclosed by the thickened and somewhat fleshy sepals.

1. **Beta vulgaris** L. Sparingly naturalized in marshy grounds at Los Angeles and San Bernardino. May.

3. APHANISMA.

Slender glabrous annual with alternate sessile entire leaves and axillary mostly solitary flowers; perianth 3-cleft with segments not thickened in fruit; stamen 1; stigmas 3; utricle, 5-costate, exceeding the perianth.

1. **A. blitoides** Nutt. Not infrequent on the coast bluffs from San Pedro to Redondo; Santa Barbara; along the coast of San Diego Co., the type locality.

4. CHENOPODIUM. Goosefoot. Lamb's Quarters.

Annual herbs (except *C. californicum*), with alternate, often fleshy, petioled leaves; flowers small, green, sessile, in axillary, terminal, or panicled spikes; lobes of the perianth usually keeled or crested; stamens 5; pericarp membranous, closely investing the lenticular seed.

Annual.

Leaves sinuate lobed or entire, never glandular.

Leaves dark green, broadly rhombic or entire, lustrous on the upper surface, slightly farinose on the lower surface......... 1. *C. murale.*

Leaves pale green, sinuate-toothed, glabrate above, densely farinose beneath........ 2. *C. album.*

Leaves entire, linear to oblong, acute........... 3. *C. leptophyllum.*

Leaves sinuate-dentate, densely farinose beneath with inflated hairs.................... 4. *C. farinosum.*

Leaves glandular pubescent, and aromatic but not farinose.

Leaves dentate or pinnatifid.

Calyx lobes rounded........................ 5. *C. ambrosioides.*

Calyx lobes keeled........................ 6. *C. carinatum.*

Perennial, leafy only below, leaves broadly triangular. 7. *C. californicum.*

1. **C. murale** L. Widely distributed in wastes and orchards; the most common of the family in S. California, and growing almost continuously. 1860.

2. **C. album** L. Pigweed. Common on wastes and edges of cultivated grounds. Autumn. 1860.

3. **C. leptophyllum** Nutt. Narrow-leaved Pigweed. Common in sandy soils and along roadsides at Vernon and Crescenta in Los Angeles Co., and is probably frequent in S. California. Our plants are subglabrate and rarely mealy. July-August.

4. **C. farinosum** Standley. Occasional at Nigger Slough and Wilmington.

5. **C. ambrosioides** L. Mexican Tea. Wormseed. Common on wastes and waysides. The broad leafed form, the var. *anthelminticum* of authors, is more abundant at the seaside. 1860. July-Aug.

6. **C. carinatum** R. Br. Ontario, 1918, Johnston; Pasadena, 1906. A native of Australia.

7. **C. californicum** Wats. Soap Plant. Frequent on open foothill slopes throughout our region. May.

5. ROUBIEVA.

A perennial, strongly scented, glandular-pubescent, prostrate herb, with narrow, small, deeply pinnatifid leaves; flowers minute green, perfect or pistillate, solitary or 2 or 3 together in the axils; calyx urceolate 5-lobed, becoming ovoid in fruit; stamens 5; stigmas 2-5.

1. **R. multifida** Moq. Pasadena Streets, 1895. Compton; Studebaker. June-July.

6. MONOLEPIS.

A low annual with narrow entire and hastate leaves; flowers polygamous, in dense axillary clusters; calyx 1; stamen 1; stigmas 2; utricle compressed, the pericarp slightly adherent to the seed.

1. **M. Nuttalliana** Greene. In dry alkaline soils on the desert and in the interior valleys; Santa Monica. May.

7. ATRIPLEX. Salt Bush.

Annual or perennial herbs or shrubs, more or less mealy or scurfy; leaves mostly alternate, sessile or petiolate; flowers monoecious or dioecious, usually clustered in axillary, simple or panicled spikes; staminate flowers bractless; pistillate flowers subtended by 2 persistent bracts that become enlarged and thickened, enclosing the fruit.

Herbs annual.
Leaf-blades more than 15 mm. long.
Leaves petiolate.
Leaf-blades rhombic-lanceolate to lanceolate... 1. *A. patula.*
Leaf-blades rhombic-oval or ovate............ 2. *A. rosea.*
Leaves sessile or subsessile.
Leaf-blades dentate .... 3. *A. Serenana.*
Leaf-blades deltoid, ovate, clasping.......... 4. *A. mohavensis.*
Leaf-blades oblong or obovate............... 5. *A. coronata.*
Leaf-blades ovate-deltoid or obovate-deltoid... 6. *A. sordida.*
Leaf-blades less than 15 mm. long.
Leaf-blades repand-dentate.................. 7. *A. Davidsonii.*
Leaf-blades entire.
Plant scurfy and villous.................... 8. *A. Parishii.*
Plant scurfy only.
Bracts few toothed at apex................ 9. *A. pacifica.*
Bracts dentate ....10. *A. fasciculata.*
Herbs perennial, prostrate or decumbent (except *A. Coulteri*).
Leaf-blades less than 15 mm. long.
Bracts toothed ....11. *A. Coulteri.*
Leaf-blades more than 15 mm. long.
Bracts entire, plant greenish.................12. *A. californica.*
Bracts entire and fleshy......................13. *A. semibaccata.*
Bracts entire or dentate; plant densely scurfy...14. *A. leucophylla.*
Bracts denticulate; plant hoary................15. *A. Watsoni.*
Shrubs, dioecious.
Fruiting bracts without lateral wings.
Leaves sessile; branchlets spinose.
Leaves spatulate ....16. *A. polycarpa.*
Leaves clasping ....17. *A. Parryi.*

Leaves petioled.
Leaves coarsely toothed....................18. *A. hymenelytra.*
Leaves triangular-hastate ....19. *A. lentiformis.*
Leaves entire ....20. *A. Breweri.*
Leaves entire; branchlets spinose............21. *A. confertifolia.*
Fruiting bracts with lateral wings.
Leaves spatulate; bracts more than 7 mm. long..22. *Ay canescens.*
Leaves linear; bracts less than 7 mm. long......23. *A. linearis.*
Shrubs, monoecious.
Leaves ovate-oblong, short petiolate............24. *A. orbicularis.*

1. **A. patula** L. Orache. Common in alkaline flats and coast marshes. Autumn.

2. **A. rosea** L. Roadsides, Ballona, 1892.

3. **A. Serenana** Nelson. Widely distributed along roadsides in the cities and sub-saline grounds under cultivation.

4. **A. mohavensis** Standl. Common on city wastes and alkaline soils throughout Southern California. Mohave Desert, type locality.

5. **A. coronata** Wats. On a dried up lake bed at San Jacinto, *Jepson.*

6. **A. sordida** Standley. Riverside and Los Angeles counties. San Jacinto Valley, type locality.

7. **A. Davidsonii** Standley. Shore sands of Los Angeles and Orange counties, Balboa type locality.

8. **A. Parishii** Wats. Rather rare, sea shore Santa Monica and Redondo. Costa Station, Los Angeles, type station.

9. **A. pacifica** Nelson. Fairly common near the coast from Los Angeles to San Diego, the type locality.

10. **A. fasciculata** Wats. Desert sands from Salton Sea eastwards; Fish Ponds, Mohave Desert, type locality.

11. **A. Coulteri** Dietr. Near the coast from Los Angeles to Lower California, and the adjacent islands, *Standley.*

12. **A. californica** Moq. Common on the bluffs along the entire coast of the mainland and adjacent islands.

13. **A. semibaccata** R. Br. Introduced as a forage plant from Australia in 1890, now well established in waste grounds. Very abundant in Los Angeles and neighborhood.

14. **A. leucophylla** Dietr. Not uncommon on all our sea beaches.

15. **A. Watsoni** Nelson. On the coast beaches at San Pedro, Newport, and San Diego the type locality.

16. **A. polycarpa** Wats. Mecca and Calexico, *Parish.* Mohave Desert east from Barstow.

17. **A. Parryi** Wats. Mohave Desert north and east from Lancaster. Near Colton, type locality.

18. **A. hymenelytra** Wats. From Victorville north to Inyo Co. Colorado Desert, *Jepson.*

19. **A. lentiformis** Wats. In alkaline soils at Mecca, *Parish.*

20. **A. Breweri** Wats. On the coast bluffs, from Santa Monica to Ventura.

21. **A. confertifolia** Wats. Common on the Mohave Desert.

22. **A. canescens** Nutt. Shad Scale. Common on the Mohave and Colorado Deserts.

23. **A. linearis** Wats. In the southeast section of the Colorado Desert; Barstow, *Jepson.*

24. **A. orbicularis** Wats. Coast bluffs from San Juan Capistrano to Santa Barbara; Santa Monica type locality.

8. ENDOLEPIS.

Branched annuals with more or less scurfy herbage; leaves alternate, entire, dentate or hastate, somewhat succulent; flowers polygamous or dioecious, the staminate near the ends of the branches, 5-cleft; the pistillate calyx 3-4-cleft enclosed in 2 entire bracts partially united at the base; stigmas 2; utricle enclosed in the bracts, the pericarp free.

1. **E. Covillei** Stand. Mohave Desert northeast of Lancaster. May.

9. GRAYIA.

Slightly scurfy or mealy undershrubs with usually spinose branches; leaves alternate, sessile, entire; flowers dioecious, small, in axillary clusters or terminal spikes; calyx 4-5 parted; stamens 4-5; bracts enlarged in fruit and broadly winged.

1. **G. spinosa** Moq. Mohave Desert north to Inyo; rather rare. May.

10. EUROTIA. WINTER FAT.

A low stellately tomentose shrub; leaves alternate, entire, linear to narrowly linear-lanceolate; flowers small, clustered, axillary and subspicate; calyx 4-parted; stamens 4; stigmas 2.

1. **E. lanata** Moq. Colorado and Mohave Deserts. May.

11. KOCHIA.

Low perennial from a woody base; leaves in ours sessile, linear, oblong, flat, densely silky; flowers clustered or solitary in the axils; perianth densely tomentose, persistent, the lobes transversely winged; stamens 5.

1. **K. californica** Wats. Occasional in the Mohave Desert; Colton, type locality.

12. ARTHROCNEMUM.

Closely resembles *Salicornia* in appearance; but has the seeds glabrous, endosperm present, and embryo curved.

1. **A. subterminale** Stand. Common in the coast marshes from Newport to San Diego; San Jacinto River, *Parish.* May-August.

13. SALICORNIA. Samphire. Glasswort.

Low, fleshy, leafless saline plants, mostly herbaceous, with oppositely branched jointed stems; flowers mostly perfect, immersed in groups of 3-7 or rarely solitary on opposite sides of the joints, the flowering joints forming terminal cylindrical spikes; stamens 1 or 2, anthers exserted; stigmas 2; seeds villous; embryo conduplicate.

Perennial .... 1. *S. pacifica.*
Annual.
  Joints of spikes broad as long or broader......... 2. *S. Bigelovii.*
  Joints of spikes longer than broad.
    Plant erect, branches forming an acute angle with the stem........................ 3. *S. Europaea.*
    Plant prostrate, branches forming a wide angle with the stem........................ 4. *S. depressa.*

1. **S. pacifica** Stand. Very common in the salt marshes along the coast. May-August.

2. **S. Bigelovii** Torr. Salt marshes, San Diego.

3. **E. europeae** L. Alkaline marshes in the desert regions, *Jepson;* San Diego.

4. **S. depressa** Stand. San Diego, type locality.

14. SARCOBATUS. Black Greasewood.

A divaricately branched shrub with linear fleshy leaves; staminate flowers naked, in aments; pistillate flowers with a saccate calyx adherent at the 2-lipped apex to the base of the stigmas; calyx laterally margined with an erect 2-lobed border, this finally becoming a broad, membranous wing.

1. **S. vermiculatus** Torr. In dry, alkaline soils of the Mohave and Colorado Deserts.

15. DONDIA. Sea Blite. Quelite. Salado.

Succulent, more or less clammy herbs or suffrutescent plants with inconspicuous flowers and fruits; leaves terete, alternate; flowers sessile in the axils of leaflike bracts; calyx 5-parted, enclosing the fruit; stamens 5; seeds vertical or horizontal.

Annual.
- One or 2 of the sepals keeled; leaves broadest at the base.
  - Leaves of the inflorescence lance-linear......... 1. *D. minutiflora.*
  - Leaves of the inflorescence ovate or lance-ovate.. 2. *D. depressa.*

Perennial.
- Leaves flat.
  - Herbage glabrous or nearly so................. 3. *D. Torreyana.*
  - Herbage tomentose or villous.................. 4. *D. ramossisima.*
- Leaves subterete.
  - Leaves of the inflorescence crowded; seeds 1.5-2 mm. broad .... 5. *D. californica.*
  - Leaves of the inflorescence not crowded; seeds 0.8 mm. broad....................... 6. *D. fruiticosa.*
- Leaves subterete, pubescent; calyx densely pubescent.
  - Leaves 12-25 mm. long, acute.................. 7. *D. taxifolia.*
  - Leaves 3-8 mm. long, obtuse................... 8. *D. brevifolia.*

1. **D. minutiflora** Heller. Alkaline plains near San Bernardino, and marshes near the coast; Santa Barbara, type locality.

2. **D. depressa** Britt. Fort Tejon; Colorado Desert.

3. **D. Torreyana** Standley. Saline soils of the interior, and coast marshes throughout southern California.

4. **D. ramossisima** Stand. Colorado Desert to western Arizona, *Standley*.

5. **D. californica** Heller. Common on the edges of the coast marshes.

6. **D. fruiticosa** Druce. The common species in alkaline soils.

7. **D. taxifolia** Standley. Borders of salt marshes from Newport to Santa Barbara; Playa Del Rey, type locality.

8. **D. brevifolia** Standley. Coast of southern California from Newport to lower California. Rare at Newport the type locality.

16. SALSOLA. Russian Thistle.

Annual herb, densely branched, with rigid awl-shaped leaves; flowers perfect with 2 bractlets; calyx 5-parted, the segments finally horizontally winged on the back; stamens usually 5; styles 2; flowers sessile, axillary.

1. **S. pestifer** Nelson. One of the common "tumbleweeds" generally, but sparsely, distributed. Lancaster, 1890.

2. AMARANTHACEAE. Amaranth Family.

Annual or perennial herbs with erect, diffuse or prostrate habits, alternate or opposite exstipulate leaves and apetalous, unisexual or dioceous flowers, in crowded axillary or terminal bracted heads, or simple or paniculately branched spikes, sepals commonly 5, scarious or herbaceous; stamens 5 or fewer, often with intermediate pseudostaminodia; pistil simple; ovary mostly 1-seeded; fruit a utricle or pyxidium.

Anthers 4-celled; leaves alternate; perianth present in all flowers........................ 1. Amaranthus.
Anthers 2-celled; leaves opposite; filaments united into a short tube; staminodia present.
Plant erect, pubescent with stellate hairs; floral involucre of reduced leaves............. 2. Tidestromia.
Plant prostrate; flower clusters sessile, axillary, small .... 3. Achyranthes.

1. AMARANTHUS. Amaranth. Pigweed.

Coarse annuals with petioled leaves and flowers of greenish scale-like sepals, subtended by spine-tipped greenish or reddish bracts, borne in axillary clusters or terminal spikes.

Flowers monoecious.
  Flowers in short clustered terminal or axillary spikes.
    Sepals usually fewer than 5.
      Sepals 4 or 5; plant prostrate.............. 1. *A. blitoides.*
      Sepals 3; plant erect....................... 2. *A. graecizans.*
  Flowers mostly in dense terminal spikes.
    Sepals 5.
      Stamens 3.
        Spike naked .... 3. *A. Powellii.*
        Spike leafy below and leaves linear........ 4. *A. fimbriatus.*
      Stamens 5.
        Sepals obtuse; spikes stout................ 5. *A. retroflexus.*
        Sepals acute; spikes slender................ 6. *A. hybridus.*
Flowers dioecious.
  Utricle circumcissile .... 7. *A. Palmeri.*
  Utricle fleshy, indehiscent....................... 8. *A. deflexus.*

1. **A. blitoides** Wats. Not common, but slowly increasing in the neighborhood of Los Angeles; Lancaster; Santa Monica, 1892.

2. **A. graecizans** L. Tumbleweed. Common and too well known on farm lands. Native of Europe.

3. **A. Powellii** Wats. Reported from Pasadena.

4. **A. fimbriatus** Benth. Mohave and Colorado Deserts; San Diego.

5. **A. retroflexus** L. Common in orchards and wastes. Native of South America.

6. **A. hybridus** L. Not uncommon in waste and cultivated grounds throughout southern California. Native of tropical America.

7. **A. Palmeri** Wats. This common Arizona plant extends westward to Imperial and San Diego counties.

8. **A. deflexus** L. Naturalized along city streets, in some places abundantly so. Los Angeles, 1902.

2. TIDESTROMIA.

Erect or decumbent herbs, densely covered with a white stellate pubescence; leaves petiolate; flowers very small, yellow, in small axillary clusters.

1. **T. oblongifolia** (Wats.) Stand. (Cladothrix lanuginosa Wats.) Colorado and eastern Mohave Deserts.

3. ACHYRANTHES.

Perennial herbs with prostrate stems, ovate short petioled leaves and pale yellowish flowers in dense heads; bracts conspicuous; sepals 5, very unequal; stamens 5, staminodia shorter than the filaments.

1. **A. repens** L. Streets of Los Angeles. 1884.

3. ALLIONACEAE. Four-o'clock Family.

Annual or perennial herbs with usually dichotomus stems, the joints often swollen; leaves opposite or alternate, usually entire, exstipulate, petiolate or sessile, the opposite ones often very unequal; flowers regular, perfect or sometimes unisexual, mostly subtended by bracts forming a calyx-like involucre, perianth of only a calyx, this usually colored and corolla-like, stamens 1 to many; anthers 2-celled, opening by longitudinal fissures; ovary 1-celled, superior but surrounded by the calyx tube, sessile or short-stalked; stigma usually capitate, ovule solitary, erect; fruit an anthocarp, indehiscent, either fleshy, leathery, or hard, either angled, ribbed, grooved, or winged.

- Fruit not winged except in *Wedeliella*.
  - Involucre gamophyllous, calyx-like.
    - Involucre 3-parted .... 1. Wedeliella.
    - Involucre 5-parted.
      - Involucre 1-5-flowered, accrescent........... 2. Allonia.
      - Involucre 1-flowered; perianth tube very short. 3. Hesperonia.
      - Involucre 3-10-flowered; perianth tube very long .... 4. Quamoclidion.

- Involucre polyphyllous, segments distinct.
  - Flowers solitary; perianth conspicuous with a long tube .... 5. ACLEISANTHES.
  - Flowers umbellate; perianth small, tube short, fruit angled .... 6. BOERHAAVIA.
- Fruit deeply lobed or winged, thick, coriaceous; flower pentamerous .... 7. ABRONIA.

1. WEDELIELLA.

Ours perennial herbs with prostrate stems, leaves opposite, petiolate, involucre of 3 oval sepal-like bracts united at the very base, solitary on axillary peduncles, perianths purplish red, 3 in each involucre; fruit winged on each side, the wings with a few broad teeth.

1. **W. incarnata** Cockrl. (Allonia incarnata L.) From Palm Springs eastwards on the Colorado Desert. April.

2. ALLIONIA L. UMBRELLA-WORT.

Perennial herbs, with rather fleshy leaves; involucre gamophyllous 5-lobed, enlarged in fruit; flowers 1-5 in each involucre; perianth in ours pink, short funnelform or campanulate, oblique; stamens 2-5 (in ours 3 and long exserted); fruit clavate, 5-angled or 5-ribbed.

1. **A. pumila** Stand. Providence Mountains, Brandegee.

3. HESPERONIA. FOUR-O'CLOCK.

Perennial herbs with dichotomus stems, usually pubescent and viscid; leaves opposite, entire; flowers involucrate, involucre campanulate 1-flowered; perianth campanulate-funnelform, purplish or white, the limb 5-lobed; stamens 5; fruit globose or oval, smooth, often with 10 light colored vertical lines. *(Mirabilis.)*

- Involucral lobes broadly ovate.
  - Plant conspicuously pubescent.
    - Pubescence of slender villous hairs.
      - Stems villous only about the inflorescence.
        - Perianth rose-colored; leaves obtuse at apex. 1. *H. californica.*
        - Perianth white; leaves broadly rounded at apex .... 2. *H. retrorsa.*
      - Stems villous nearly throughout.............. 3. *H. Bigelovii.*
    - Pubescence of short conic hairs............ 4. *H. cedrosensis.*
- Involucral lobes linear or lanceolate.
  - Involucres 7-9 mm. long; leaf-blades 2.5 cm. long, viscid above .... 5. *H. polyphylla.*
  - Involucres 10-13 mm. long; leaf-blades more than 2.5 cm. long, viscid throughout......... 6. *H. tenuiloba.*

1. **H. californica** Stand. Wishbone Bush. Common in the foothills of the coast region. Jan.-June.

2. **H. retrorsa** Stand. In dry sandy soils from Mohave Desert to San Diego Co. April-May.

3. **H. Bigelovii** Stand. Mohave and Colorado Deserts.

4. **H. cedrosensis** Stand. San Clemente Island, *Standley.*

5. **H. polyphylla** Stand. San Diego Co. to Lower California.

6. **H. tenuiloba** Stand. Colorado Desert. San Bernardino Co., type locality.

4. QUAMOCLIDION.

Low spreading perennial, with large glabrous, or glandular-pubescent, petiolate ovate leaves; involucre gamophyllous, calyx-like; flowers large purplish red, 3-8 in each involucre; perianth with a thick, rather long tube, and a plicate 5-lobed limb; stamens 5, exserted; fruit smooth. (*Mirabilis* in part.)

1. **Q. Froebelii** Stand. On the Mohave Desert and in sandy soils on the lower mountain slopes throughout southern California; abundant near Manzana; Warners Ranch, type station. June.

5. ACLEISANTHES.

Low, perennial herbs, leaves opposite, thick and fleshy, petiolate, long attenuate at the apex, flowers axillary or terminal; perianth white, with a very much elongated slender tube and 5-lobed limb; stamens 2-5 unequal; fruit narrowly ellipsoid, 5-angled or 5-ribbed.

1. **A. longiflora** Gray. Marie Mts., Riverside Co.

6. BOERHAAVIA.

Slender annual or perennial herbs, often with glandular rings about the internodes, with opposite more or less unequal leaves and small flowers in loose panicles, verticels or spikes; perianth 5-lobed; stamens 1-5; fruit clavate or obpyramidal 3-5 ribbed or angled.

Perennial; fruit pubescent........................ 1. *B. caribaea.*
Annual; fruit glabrous.
  Flowers not racemose........................ 2. *B. intermedia.*
  Flowers racemose .... 3. *B. Coulteri.*

1. **B. caribaea** Jacq. San Jacinto Valley, *Jepson.*

2. **B. intermedia** Jones. Southeastern California, *Standley.*

3. **B. Coulteri** Wats. Southeastern section of the Colorado Desert.

7. ABRONIA. Sand Verbena.

Annual or perennial mostly prostrate herbs more or less pubescent with viscid hairs; leaves opposite those of a pair very unequal, entire or sinuate-lobed; flowers in capitate clusters, showy, each subtended by usually 5 distinct scarious bracts; perianth yellow, white or red, with a long tube and a 5-lobed limb; stamens usually 5; fruit leathery with 2-5 wings or lobes.

Perianth yellow .... 1. *A. latifolia.*
Perianth deep dark-red.......................... 2. *A. maritima.*
Perianth white, pink or purplish.
  Fruits winged.
    Annual.
      Wings 2 .... 3. *A. pogonantha.*
      Wings 3-5.
        Perianth 16-20 mm. long........'.......... 4. *A. pinetorum.*
        Perianth 10-14 mm. long.
          Wings of fruit rugose-veined............ 5. *A. villosa.*
          Wings of fruit thin and soft.
            Bracts ovate; leaves undulate.......... 6. *A. gracilis.*
            Bracts lanceolate; leaves entire......... 7. *A. minor.*
    Perennial.
          Wings of fruit indurate, woody.......... 8. *A. alba.*
          Wings of fruit thin and soft............. 9. *A. umbellata.*
  Fruits with hollow, wing-like lobes................10. *A. Covillei.*

1. **A. latifolia** Eschsch. (Yellow Sand Verbena.) Seashore, Santa Barbara.

2. **A. maritima** Nutt. Sea shore sands from Santa Barbara to San Diego; San Pedro, type locality. April-June.

3. **A. pogonantha** Heimerl. The common species of the Mohave Desert; Acton. Bank of the Mohave River, type locality. April-July.

4. **A. pinetorum** Abrams. Thomas Valley, San Jacinto Mts., type locality; in sandy soils from Palm Springs eastwards in the Colorado Desert. April.

5. **A. villosa** Wats. Colorado Desert; Mohave Desert, *Hall.* April.

6. **A. gracilis** Benth. Beach sands, San Diego.

7. **A. minor** Stand. Sandy beaches from San Luis Obispo to San Diego Co., *Standley.*

8. **A. alba** Eastwood. Sandy seashores of San Nicholas (type locality); San Clemente Island, and the adjacent coast of the mainland. April-May.

9. **A. umbellata** Lam. The common sand-verbena of the coast from Santa Barbara to Redondo. May.

10. **A. Covillei** Heimerl. Rose Mine, San Bernardino.

4. BATIDACEAE.

A low seaside glabrous herb with opposite entire leaves and dioecious flowers in oblong axillary sessile ament-like spikes; staminate flowers free with a campanulate 2-lipped calyx; stamens 4, alternate with as many unguiculate petals; pistillate flowers 8-12, united into a fleshy spike without perianth; ovary 4-celled with a single ovule in each cell.

1. BATIS.

Characters of the family.

1. **B. maritima** L. Frequent in marshes on the seashore from Redondo to San Diego. May.

5. AIZOACEAE. Carpet-weed Family.

Ours succulent herbs, except *Mollugo,* with plane triquetrous or terete opposite leaves without stipules; calyx 5-lobed, herbaceous, petaloid, the tube adnate or free from the ovary; petals numerous or wanting; stamens 3-many; styles 3-20; fruit a capsule 3-20 celled, dehiscence various.

Ovary free from the calyx; petals none.
  Sepals distinct; stamens 3-5; capsule 3-valved; leaves not succulent................ 1. Mollugo.
  Sepals united below, petaloid; stamens 5-60; capsule circumscissile; leaves succulent .... 2. Sesuvium.
Ovary adnate to the calyx tube; petals and stamens numerous; leaves very fleshy 3. Mesembrianthemum.

1. MOLLUGO. Carpet-weed.

Slender prostrate, glabrous, much branched annuals with whorled, linear or oblanceolate leaves and axillary flowers on slender pedicels; sepals 5, white inside; stamens 5 and alternate with the sepals or 3 and alternate with the cells of the ovary; capsule 3-celled, dehiscent.

1. **M. verticillata** L. Indian Chickweed. Southern Pacific Railway near Los Angeles; pond near Garvanza. 1893. August.

2. SESUVIUM. Sea Purslane.

Fleshy, decumbent or prostrate herbs with small axillary or terminal rose-pink flowers; calyx 5-lobed scarious margined, colored within; petals none; fruit ovate oblong, 3-5-celled, circumscissile about the middle, many seeded.

1. **S. sessile** Pers. Occasional on the borders of brackish pools from Gardena to Wilmington; Imperial Valley; Ramona. June-September.

3. MESEMBRIANTHEMUM. Fig Marigold.

Fleshy maritime herbs with triangular or terete, succulent leaves and large, showy, terminal, white, pink or red flowers; petals and stamens numerous, fruit structurally capsular but in ours juicy and baccate.

- Annual; leaves alternate; herbage covered with shining vesicles.
  - Leaves linear, semiterete........................ 1. *M. nodiflorum.*
  - Leaves flat with more or less expanded lamina.... 2. *M. crystallinum.*
- Perennial; leaves opposite, triquetrous, smooth...... 3. *M. aequilaterale.*

1. **M. nodiflorum** L. Local on the coast beaches at San Diego; San Juan; San Clemente and Catalina Islands. May-June.

2. **M. crystallinum** L. Ice-plant. In saline soils along the coast from Santa Barbara to San Diego, but not common. Mohave Desert, *Brandegee.* May-June.

3. **M. aequilaterale** Haw. "Beach Strawberry." Common along the seashore. April-Sept.

6. PORTULACACEAE. Purslane Family.

More or less succulent herbs, with entire leaves and regular complete flowers which open in sunshine only; sepals 2-8; petals 5-16; stamens variable, opposite the petals, filaments distinct; ovary 1-celled, with few or many ovules on a central placenta.

- Capsules circumscissile.
  - Ovary inferior; flowers small, yellow............. 1. Portulaca.
  - Ovary superior; flowers large, white or roseate.... 2. Lewisia.
- Capsules 3-valved at the apex.
  - Leaves alternate, scattered along the stem; stamens 5-12 .... 3. Calandrinia.
  - Leaves basal (except the involucral pair); stamens 3-5 .... 4. Montia.
  - Leaves opposite, scattered along the stem; flowers white .... 5. Crunocallis.
- Capsules 2-valved at the apex.
  - Flowers in close, white scorpioid spikes; petals 4; stamens 3 ....6. Spraguea.
  - Flowers in loose scorpioid spikes; petals 2-4; stamens 1-3 .... 7. Calyptridium.

1. PORTULACA. Purslane.

Glabrous prostrate annual with fleshy leaves and terminal, sessile, yellow flowers; calyx 2-cleft, the lower part adnate to the capsule; petals 4-6; style branches 3-8; capsule circumscissile, opening by a lid.

1. **P. oleracea** L. Common in waste and cultivated ground. June-Sept.

2. LEWISIA. Bitter Root.

Perennial acaulescent herbs with fleshy roots bearing on the crown a cluster of fleshy leaves and showy white or roseate flowers; sepals 2-8; petals 5-16; stamens numerous; capsule circumscissile.

Scapes bracted beneath the calyx; leaves spatulate; stamens 10-15 .... 1. *L. brachycalyx.*

Scapes bracted near the middle; leaves linear; stamens 40 or more.......................... 2. *L. rediviva.*

Scapes bracted near base; leaves widest above the middle; stamens 12-15................. 3. *L. bernardina.*

1. **L. brachycalyx** Engelm. Bear Valley, *Parish.* The only known station in California.

2. **L. rediviva** Pursh. Bitter Root. San Bernardino Mts.; Mts. San Antonio and Pinos.

3. **L. bernardina** Davidson. San Bernardino Mts. May.

3. CALANDRINIA.

Low glabrous annuals with alternate entire leaves and flowers in racemes or panicles; sepals 2, subequal, persistent; petals 3-7; stamens 3-12; capsule 3-valved from the summit.

Flowers in racemes, red or rose colored.
  Capsule nearly equalling the enveloping sepals; leaves linear to oblanceolate............ 1. *C. Menziesii.*
  Capsule nearly twice as long as the sepals; leaves spatulate .... 2. *C. Breweri.*
  Capsule little shorter than the dark veined sepals; leaves broadly obovate................. 3. *C. maritima.*
Flowers in umbellate panicles, white................ 4. *C. ambigua.*

1. **C. Menziesii** T. & G. Red Maids. Common on grassy mesas especially near the coast. February-May.

2. **C. Breweri** Wats. Local on City Creek road, San Bernardino Mts.; Topango Canyon. June.

3. **C. maritima** Nutt. Santa Monica; San Diego, type locality. April.

4. **C. ambigua** Howell. Colorado Desert from Indio eastwards. April.

4. MONTIA. Indian Lettuce.

Glabrous annuals with leaves all basal except an involucral pair (sometimes united) under the racemose or subumbellate inflorescence; flowers white or pinkish; sepals 5; stamens 5; capsule 5-valved. *(Claytonia.)*

Petals united at the base into a tube.............. 1. *M. fontana.*
Petals distinct or a little united.
  Cauline pair of leaves united into a roundish disk. 2. *M. perfoliata.*
  Cauline leaves partially united on one side.
    Plants light green, dwarf; inflorescence crowded, short .... 3. *M. spathulata.*
    Plants dark green; inflorescence lax and fewer flowered .... 4. *M. viridis.*
  Cauline leaves distinct; flowers with long pedicels. 5. *M. sibirica.*

1. **M. fontana** L. Witch Creek, San Diego Co.

2. **M. perfoliata** Howell. Common in shady places in all our mountains.

3. **M. spathulata** Howell. Occasional in the mountain canyons on the southern border of the Mohave desert; Piru Creek. May.

4. **M. viridis** Davidson. Occasional with the last on the Mohave border: Mt. San Antonio, *Hall;* abundant at Seven Oaks. Rock Creek, type locality. July.

5. **M. sibirica** Howell. Little Bear Valley, *Kessler.*

5. CRUNOCALLIS.

Slender stoloniferous perennials the stems rooting at the nodes; leaves opposite, oblong or oblanceolate; petals white, 3 or 4 times as long as the calyx; stamens 3-5; ovary 3-ovuled. *(Claytonia.)*

1. **C. Chamissonis** Rydb. San Jacinto and San Bernardino Mts., at 1,850 to 2,100 meters; Mt. Piños, *Hall.* July.

6. SPRAGUEA. Pussy Paws.

Annual or perennial glabrous herb with fleshy spatulate leaves forming a rosette at the base of the ascending scape-like inflorescence; flowers white or roseate in terminal heads or cymes; petals 4; stamens 3.

1. **S. umbellata** Torr. Common in the Transition Zone, San Bernardino Mts.; Mt. Antonio, *Burlew.* July.

7. CALYPTRIDIUM.

Glabrous herbs with thick spatulate, alternate leaves and small ephemeral flowers, solitary or clustered in scorpioid spikes; sepals, 2, scarious or scarious-margined, persistent; petals 2-4; stamens 1-3; capsule 2-valved.

Petals 2 or 3; spikes not scorpioid; capsule 3 or 4 times the length of the sepals......... 1. *C. monandrum.*
Petals 4; spikes scorpioid; capsule little exceeding the sepals .... 2. *C. Parryi.*

1. **C. monandrum** Nutt. Widely distributed in sandy soils both in foothills and mountains; San Diego, type locality. April-June.

2. **C. Parryi** Gray. San Jacinto and San Bernardino Mts. Common at Bear Valley, the type locality. July.

7. ALSINACEAE. Chickweed Family.

Low, slender annuals or perennials with opposite simple leaves and small white or pink flowers borne in cymes or solitary in the axils; sepals 4 or 5, distinct or slightly united at the base; petals commonly 5, occasionally fewer or none, simple, entire or cleft; fruit a capsule.

Stipules wanting.
- Petals 2-cleft or 2-parted.
  - Capsule short, ovate or oblong; styles usually 3. 1. Alsine.
  - Capsule long-cylindric and often curved; styles usually 5 .... 2. Cerastium.
- Petals entire or emarginate.
  - Styles as many as the sepals and alternate with them .... 3. Sagina.
  - Styles fewer than the sepals, or when of the same number opposite them.
    - Seeds with a basal membrane (strophiole) at the hilum .... 4. Moehringia.
    - Seeds not strophiolate.
      - Capsules with twice as many valves as styles. 5. Arenaria.
      - Capsules with as many valves as styles..... 6. Alsinopsis.

Stipules present.
- Styles 3; leaves opposite........................ 7. Tissa.
- Styles 5; leaves apparently whorled.............. 8. Spergularia.
- Style 1, 3-cleft.
  - Leaves flat, oblong or ovate; petals half the length of the sepals......................... 9. Polycarpon.
  - Leaves subulate-setaceous, rigid, recurved; petals minute ....10. Loeflingia.

1. ALSINE. Chickweed.

Low mostly glabrous herbs with small axillary and solitary or terminal and cymose white flowers; sepals 5; petals 5, deeply cleft; stamens 3-10; styles 3 or 4; capsule ovoid oblong, dehiscent below the middle into twice as many valves as there are styles.

Annual; lower leaves petioled.
- Stems weak with a pubescent line; leaves ovate; bracts foliaceous .... 1. *A. media.*
- Stems glabrous, filiform; leaves lanceolate; bracts scarious .... 2. *A. nitens.*

Perennial; leaves sessile.
Leaves linear to narrowly lanceolate.
Plant viscid above.......................... 3. *A. Jamesiana.*
Plant not viscid.
Bracts scarious; leaves broadest near the base....... 4. *A. longipes.*
Bracts foliaceous.
Leaves 4 times as long as broad........... 5. *A. borealis.*
Leaves 6 times as long as broad............ 6. *A. Bongardiana.*
Leaves ovate, edges crisped; bracts foliaceous...... 7. *A. crispa.*

1. **A. media** L. Common Chickweed. A weed in shady places, generally distributed. Native of Europe.

2. **A. nitens** Greene. Shining Chickweed. Not common, but generally distributed on grassy, dry foothills. April-June.

3. **A. Jamesiana** Heller. Frazier Mt., *Hall.* Not infrequent in the Tehachapi Mts. May-June.

4. **A. longipes** Cov. Common in wet meadows in the upper Transition Zone of the San Bernardino Mts. June-July.

5. **A. borealis** Bigel. South Fork of the Santa Ana, *Wilder.*

6. **A. Bongardiana** Fern. Mt. San Jacinto, *Jepson.*

7. **A. crispa** Holtz. Round Meadow, San Jacinto, *Hall.*

2. CERASTIUM. Mouse-ear Chickweed.

Soft pubescent low herbs with white flowers in leafy or scarious bracted dichotomous cymes; sepals 5; petals 5, bifid; stamens, 10; styles 5; capsules elongated, cylindrical, much exceeding the calyx and opening at the apex by 10 teeth.

Annual; pedicels not longer than the flowers........ 1. *C. viscosum.*
Perennial; pedicels longer than the flowers.......... 2. *C. vulgatum.*

1. **C. viscosum** L. Occasional in fields and waysides, Los Angeles and San Diego, 1884. April-May.

2. **C. vulgatum** L. Common in lawns and somewhat of a pest. 1892.

3. SAGINA. Pearlwort.

Diminutive herbs with subulate or filiform exstipulate leaves, and minute long-pedicelled often apetalous flowers; sepals 4 or 5; petals, when present, 4 or 5, entire or emarginate, white; styles 4 or 5; capsule opening to the base by 4 or 5 valves.

Annual; leaves filiform; pedicels straight.
Sepals and petals 5; leaves glabrous............. 1. *S. occidentalis.*
Sepals 4; petals often wanting; leaves ciliate at base .... 2. *S. apetala.*
Perennial; terminal leaves thickish; pedicels recurved at the summit....................... 3. *S. Linnaei.*

1. **S. occidentalis** Wats. Moist and shady places, Santa Monica foothills; Pasadena; San Bernardino. May.

2. **S. apetala barbata** Fenzl. City lot at Pasadena, 1917.

3. **S. Linnaei** Presl. Arctic Pearlwort. Mt. San Jacinto, *Hall;* Bluff Lake, *Parish.* June-July.

4. MOEHRINGIA.

Weak, stoloniferous perennials with lanceolate leaves in 3 or 4 pairs and few axillary or terminal, small, white flowers; ovary at first 3-celled; seeds appendaged at the hilum.

1. **M. macrophylla** Torr. Cuiamaca and mountains east of San Diego. May.

5. ARENARIA. Sandwort.

Mostly low tufted herbs with sessile often rigid leaves and no stipules; flowers white, cymose or solitary in the axils; sepals 5; petals 5 entire, or wanting; styles 3; stamens 10; capsule globose or ovoid, opening by twice as many valves as there are styles.

Perennial; sepals ovate.
  Leaves linear or oblanceolate, not rigid or pungent. 1. *A. saxosa.*
  Leaves narrowly linear, pungent.
    Stems more than 3 cm. high, glabrous, stiff, erect. 2. *A. macradenia.*
    Stems less than 3 cm. high, slender.
      Petals exceeding sepals...................... 3. *A. capillaris.*
      Petals equalling sepals...................... 4. *A. ursina.*

1. **A. saxosa** Gray. Santa Ana Canyon, San Bernardino Mts., 2,460 meters, *Hall.*

2. **A. macradenia** Wats. Common on the mountains bordering the Mohave Desert; San Bernardino Mts. June-July.

3. **A. capillaris** Poir. San Bernardino Mts. June-July.

4. **A. ursina** Rob. Not infrequent in Bear Valley, the type locality. June-July.

6. ALSINOPSIS.

Annuals or densely tufted perennials with narrow subulate leaves and white flowers; sepals 5; petals 5, entire or emarginate; stamens 10; styles 3; capsule opening by as many valves as there are styles. (*Arenaria* in part.)

Annual; sepals ovate.
  Leaves filiform; slender much branched, slightly viscid plant; petals nearly twice as long as the sepals........................ 1. *A. Douglasii.*

Perennial.
  Leaves linear or linear-lanceolate not pungent; sepals elliptic .... 2. *A. paludicola.*
  Leaves matted at base, rigid, pungent; sepals narrow, acuminate .... 3. *A. Nuttallii.*

1. **A. Douglasii** Heller. On sterile hill-tops and sandy or gravelly plains. March-April.

2. **A. paludicola** Heller. At one time common in the tule marshes of the cienegas at Los Angeles and Sherman, now exterminated by cultivation. Santa Ana River near San Bernardino, May.

3. **A. Nuttallii gracilis** Heller. Summits of San Gorgonio and San Antonio Mts. July.

7. TISSA. Sand Spurrey.

Low, somewhat succulent herbs of maritime districts or subsaline inland plains with linear leaves and scarious stipules; sepals 5; petals 5, white or pink, entire, sometimes minute and fewer; stamens commonly 10; styles 3 or 5; capsule 3-valved. *(Spergularia.)*

Perennial.
  Foliage viscid-puberulent throughout; root fusiform; petals roseate, shorter than the sepals.. 1. *T. macrotheca.*
  Foliage glandular-puberulent above only; root fusiform; petals white, longer than the sepals .... 2. *T. leucantha.*
  Foliage pubescent and slightly viscid; leaves conspicuously fascicled; petals white equalling the sepals...................... 3. *T. Clevelandi.*
Annual.
  Petals 5.
    Foliage nearly glabrous; capsules pedicelled..... 4. *T. salina.*
  Petals less than 5 or wanting.
    Foliage glabrous; petals 1-3 or wanting; capsules very small, all pedicelled.............. 5. *T. platensis.*
    Foliage slightly pubescent above; petals few or none; capsules larger, sessile above..... 6. *T. tenuis.*

1. **T. macrotheca** Britt. Common in sandy soil on the borders of salt marshes. April-May.

2. **T. leucantha** Greene. Near San Bernardino.

3. **T. Clevelandi** Greene. Upland, *Johnston.* Frequent in sandy soil near the ocean in San Diego County, the type locality. May.

4. **T. salina** Greene. Occasional near the coast in Los Angeles Co., and on Catalina Island; West Riverside, *Reed.* April-May.

5. **T. platensis** Fenzl. Occasional in sandy grounds, Compton Fulton Wells; Wilmington. March-April.

6. **T. tenuis** Greene. Apparently not infrequent in the neighborhood of Los Angeles. April-June.

8. SPERGULARIA. CORN-SPURREY.

Herbs with linear, slightly fleshy apparently whorled leaves with small, scarious stipules and 5-merous pedicelled flowers; petals white, entire.

1. **S. arvensis** L. Roadsides San Diego, Pomona, Alhambra, Pasadena, 1895. April-June.

9. POLYCARPON.

Low diffusely dichotomously branched annuals with flat, spatulate leaves and minute white flowers in loose cymes; sepals 5; petals 5; stamens 3-5; style 3-cleft; capsules 3-valved.

Leaves in pairs; petals entire; plant low, about 2.5 cm. high	1. *P. depressum.*
Leaves, the lower in fours; petals emarginate; plant 5-7 cm. high........................	2. *P. tetraphyllum.*

1. **P. depressum** Nutt. Occasional on loamy soils throughout southern California; San Diego, type locality. May.

2. **P. tetraphyllum** L. Becoming quite common on the streets in Santa Barbara, *Payne.* 1920.

10. LOEFLINGIA.

Low, much-branched, rather rigid and pungent-leaved annuals; the leaves with adnate and connate setaceous stipules; flowers small, sessile in the axils of the leaves and branches; sepals 5; petals minute or none; stamens 3-5; capsule 3-valved.

1. **L. squarrosa** Nutt. Common on sandy roadsides at Crescenta; occasional on city streets; San Bernardino and San Diego the type locality. June-July.

8. CARYOPHYLLACEAE. PINK FAMILY.

Herbaceous annuals or perennials with opposite exstipulate leaves and cymose flowers; calyx tubular with a short limb; petals 5, clawed and frequently appendaged; fruit a capsule, dehiscent by longitudinal valves.

Styles 2; calyx 5-angled; petals not appendaged......	1. VACCARIA.
Styles 3; calyx 10 or many ribbed; petals with a scale at the base of the blade..............	2. SILENE.

1. VACCARIA. Cowherb.

Glabrous glaucous annual with cordate-clasping leaves and pale red flowers in loose corymbs; calyx ovoid, strongly 5-angled; petals not appendaged; stamens 10; styles 2.

1. **V. vaccaria** Britt. Casual in grain fields, Hollywood; roadsides Sierra Madre; San Diego, 1884.

2. SILENE. Catchfly. Campion.

Annual or perennial herbs with mostly viscid foliage and flowers solitary or in cymes; calyx tubular or inflated, 5-toothed, 10 to many nerved; petals usually with a scale at the base of the blade; stamens 10; styles 3, rarely 4; capsule 1-celled, opening by 3 or 6 teeth.

- Annual.
  - Calyx conspicuously 18 or more ribbed.
    - Plant viscid-pubescent; petals pink, 2-cleft....... 1. *S. multinervia.*
  - Calyx 10 ribbed.
    - Petals pink or white, little exceeding the calyx; stems hirsute-pubescent................ 2. *S. gallica.*
    - Petals maroon with white border, exceeding the calyx .... 3. *S. quinquevulnera*
    - Petals reddish-white, deeply bifid; leaves viscid-pubescent .... 4. *S. noctiflora.*
    - Petals red, emarginate; plant glabrous with a glutinous band on the upper internodes.... 5. *S. antirrhina.*
- Perennial.
  - Stems leafy to the top.
    - Petals yellowish white 6-cleft, appendages finely divided; calyx greenish yellow; plant very viscid, pubescent.................. 6. *S. Parishii.*
    - Petals white, 2-cleft, appendages usually wanting; foliage slightly viscid, pubescent....... 7. *S. Menziesii.*
  - Stems with leaves mostly basal.
    - Petals scarlet, 4-cleft.
      - Leaves narrowly lanceolate, sessile......... 8. *S. laciniata.*
      - Leaves elliptic-ovate, abruptly acuminate... 9. *S. californica.*
    - Petals pink, 4-cleft; stamens long exserted; stems slender, viscid above...........10...*S. Lemmonii.*
    - Petals rose colored to purple, 2-cleft, each with a lateral tooth; stems erect, glandular-pubescent ....11. *S. platyota.*

1. **S. multinervia** Wats. Local in a few places from the Ojai Valley to the Santa Monica foothills; common in the Santa Susanna Pass near Chatsworth and apparently increasing; Santa Catalina and San Diego Co., *Jamul;* the type locality. May.

2. **S. gallica** L. Windmill Pink. Common along roadsides and widely distributed. February-May. Native of Europe.

3. **S. quinquevulnera** L. Exposition Park. May. 1918.

4. **S. noctiflora** L. An occasional casual in lawns and gardens, Los Angeles and Alhambra, 1908. May.

5. **S. antirrhina** L. Sleepy Catchfly. Frequent in the foothills both of the coast and the interior. April-May.

6. **S. Parishii** Wats. Among rocks in the pine belts, San Antonio Mts., at 1,500 meters; San Bernardino Mts., the type locality; summit of Mt. San Jacinto. July.

7. **S. Menziesii** Hook. Bear Valley, San Bernardino Co., rare. July.

8. **S. laciniata** Cav. Common in the chaparral belt. April-May.

9. **S. californica** Dur. Pico Canyon near Newhall, *Mrs. W. Hutchinson.*

10. **S. Lemmonii** Wats. Fairly common in open pine forests throughout southern California, at an altitude of about 1,800 meters. June.

11. **S. platyota** Wats. Common in the pine belt and ranging with the last. June-July.

ORDER RANALES.

Anther sacs opening by hinged valves.
Stamens 6; petals 6........................ 3. BERBERIDACEAE.
Stamens 9; petals none..................... 4. LAURACEAE.
Anther sacs opening by slits; stamens numerous.
Flowers monoecious, minute, sessile; anthers with hornlike appendages; plants submerged .... 2. CERATOPHYLLACEAE
Flowers usually perfect; anthers not with hornlike appendages; mostly land plants. 1. RANUNCULACEAE.

1. RANUNCULACEAE. Crowfoot Family.

Herbs with acrid, colorless juice and polypetalous or apetalous flowers, the calyx often corolla-like; stamens numerous; ovules solitary or several; flowers regular or irregular; sepals 3-15; fruit achenes, pods or berries.

Carpels in fruit becoming achenes.
Sepals petal-like; petals none.
Sepals large, white; fruit a head of hairy-tailed achenes .... 1. CLEMATIS.
Sepals small, whitish; flowers mostly dioecious; achenes not tailed............. 2. THALICTRUM.
Sepals spurred at base.
Petals 5; flowers yellow.
Flowers solitary on a scape; achenes in an oblong head .... 3. MYOSURUS.

Sepals not spurred at base.
  Petals 5-8, white.
    Aquatic plants, submerged leaves capillary. 4. BATRACHIUM.
  Petals 5-16, yellow.
    Achenes in a globular head............... 5. RANUNCULUS.
    Achenes in an oblong head on scapes...... 6. HALERPESTES.
Carpels in fruit becoming follicles.
  Sepals regular; petals all spurred........... 7. AQUILEGIA.
  Sepals irregular; the upper one spurred....... 8. DELPHINIUM.
  Sepals large, herbaceous, persistent; petals brownish red .... 9. PAEONIA.
Carpel 1, in fruit a berry.....................10. ACTEA.

1. CLEMATIS. VIRGIN'S BOWER.

Half woody climbing shrubs with pinnatifid divided leaves and clustered or solitary flowers in the axils; sepals 4, petal-like; petals none; styles persistent, becoming long feathery tails in fruit.

Leaflets usually 5, glabrous or nearly so; sepals 7-10 mm. long; achenes silky....... 1. *C. ligusticifolia.*
Leaflets usually 3, pubescent; sepals 12-18 mm. long; achenes pubescent............ 2. *C. lasiantha.*
Leaflets usually 5, glabrous or minutely pubescent; achenes glabrous .... 3. *C. pauciflora.*

1. **C. ligusticifolia californica** Wats. Common and widely distributed from the valleys to the higher mountains. May-July.

2. **C. lasiantha** Nutt. Common in the foothills of the coast mountains. April-June.

3. **C. pauciflora** Nutt. The common species in San Diego Co., the type locality; Palm Springs; Santa Barbara, *Abrams.*

2. THALICTRUM. MEADOW RUE.

Perennial herbs with alternate compound leaves and panicles of numerous small white flowers, monoecious or dioecious; sepals 4, white; petals none; stamens many, exserted; achenes 4-15, ribbed, grooved or inflated.

Flowers perfect.
  Cauline leaves sessile.......................... 1. *T. sparsiflorum.*
Flowers dioecious; cauline leaves petioled.
  Inflorescence sparsely glandular-puberulent; achenes 3-nerved .... 2. *T. Fendleri.*
  Inflorescence glabrous throughout; achenes 1-nerved 3. *T. polycarpum.*

1. **T. sparsiflorum** Turcz. Bear Valley, San Bernardino Mts., San Jacinto Mt. July.

2. **T. Fendleri platycarpum** Trelease. Stream banks Bear Valley, *Parish.*

3. **T. polycarpum** Wats. Frequent along foothill streams, April-June.

3. MYOSURUS. Mousetail.

Low annuals with linear entire basal leaves and simple 1-flowered scapes; sepals 5, spurred or appendaged at the base; petals 5, small, sometimes wanting; stamens 5-20; pistils many, borne on a central axis, becoming much elongated in fruit.

1. **M. apetalus** Gray. Borders of Bear Valley Dam. July-Aug.

4. BATRACHIUM. Water Crowfoot.

An aquatic perennial, rooting from the nodes, with filiform dissected submerged leaves and occasionally with emersed dilated leaves; peduncles solitary; petals white with a yellow base; achenes rugose. *(Ranunculus.)*

1. **B. aquatilis trichophyllum** Gray. In ponds and quiet streams throughout our region; not common. May-August.

5. RANUNCULUS. Buttercup.

Annual or perennial with alternate, entire or dissected leaves and solitary or corymbose yellow flowers; petals usually with a nectariferous spot or pit on or above the claw; achenes capitate, numerous, smooth.

Petals 6 or more.
  Plant glabrous or slightly pubescent; cauline leaves narrow .... 1. *R. californicus.*
  Plant pubescent or silky-pubescent; cauline leaves broad .... 2. *R. latilobus.*
Petals 5.
  Plants subaquatic; leaves entire.
    Stems rooting at the nodes; leaves linear or lanceolate; petals 4 mm. long. 3. *R. reptans.*
    Stems not rooting at the nodes; leaves oblanceolate or ovate, long petioled; petals 6 mm. long .... 4. *R. alismellus.*
  Plants terrestrial; leaves divided.
    Achenes glabrous with slender hooked beak.
      Petals 7-15 mm. long; herbage glabrous; subalpine plants .... 5. *R. Eschscholtzii.*
      Petals 2-4 mm. long; herbage pilose; montane plants .... 6. *R. tenellus.*
    Achenes hispidulous, beak curved; petals 2 mm. long .... 7. *R. hebecarpus.*

1. **R. californicus** Benth. Frequent on grassy mesas along the foothills. February-April.

Var. *Ludovicianus* Davis. A stouter plant with leaves silky. In the Ventura; San Bernardino and Tehachapi Mts.

2. **R. latilobus** Gray. Abundant in meadows at Bear Valley; San Diego Co.

3. **R. reptans** L. Frequent in wet places in the San Bernardino and San Jacinto Mts.

4. **R. alismellus** Gray. Common in marshy ground in San Bernardino and San Jacinto Mts. July.

5. **R. Eschscholtzii** Schlecht. Summits of San Jacinto and San Gorgonio Mts. July.

6. **R. tenellus** Nutt. (R. Bongardii Greene.) Lower Transition Zone, San Bernardino.

7. **R. hebecarpus** H. & A. Shady slopes and meadows, chiefly in the coast ranges. March-May.

6. HALERPESTES.

Low, glabrous perennial with orbicular, crenate leaves and long, slender runners; scapes 1-5 flowered; petals 5-8, yellow; achenes numerous, crowded into an oblong head. *(Ranunculus.)*

1. **H. cymbalaria** Greene. Borders of stream and moist grounds. April-June.

7. AQUILEGIA. Columbine.

Perennial herbs with twice or thrice ternately compound leaves with lobed leaflets; flowers large and showy (in ours scarlet); sepals 5, regular; petals 5, all spurred; pods erect.

1. **A. truncata** F. & M. In moist, shady places in the foothill canyons and at middle elevations in all our mountains. May-August. *A. hypolasia* Greene, type locality, Pine Valley, San Diego Co., has smaller flowers and is said to flower in June, otherwise it seems to be identical with *A. truncata.*

A. truncata var. *pauciflora* Jeps., with naked stems and a few flowers is common in the Canadian Zone in the San Bernardino and San Jacinto Mts.

8. DELPHINIUM. Larkspur.

Erect perennial herbs with petioled palmately divided leaves and terminal racemes of irregular flowers of scarlet, blue or lavender color; sepals 5, colored; the upper one prolonged into a spur; petals 4, two of them with projections that are inserted in the spur of the calyx; pods 1-5, many seeded.

Flowers red .... 1. *D. cardinale.*
Flowers dark blue.
  Leaves minutely puberulent, divisions linear, obtuse; sepals 12-15 mm. long, longer than the petals and equalling the spur; follicles recurved at the apex; seeds winged; stems simple .... 2. *D. Parryi.*

Leaves puberulent, divisions broader, acute, mucronulate; sepals 15-25 mm. long; seeds not winged; stem branched............ 3. *D. maritima.*

Leaves with 3-5 broad lobes, glabrous; pedicels pubescent; sepals 11 mm. long; follicles widely divergent; stems lax............ 4. *D. decorum.*

Leaves 5-parted, lobes large; pedicels glandular-pubescent; stems simple .... 5. *D. patens.*

Leaves numerous, deeply cleft, glabrous; follicles not divergent .... 6. *D. scopulorum.*

Flowers light blue, plant glabrous with the general aspect of *D. Parryi;* sepals equalling the petals and shorter than the spur...... 7. *D. Parishii.*

Flowers pale lavender; leaves few, pubescent or glabrous, divisions linear; sepals frequently recurved; follicles thick, oblong; stem fistulous.................. 8. *D. recurvatum.*

Flowers purple; leaves puberulent, divisions linear.. 9. *D. Cuyamacae.*

1. **D. cardinale** Hook. Frequent in stream washes and canyons. June-July.

2. **D. Parryi** Gray. The common species of the plains and interior mountains. April-June.

3. **D. maritima** Davidson. Along the coast from Santa Barbara to San Diego; Ballona, type locality. April-June.

4. **D. decorum** F. & M. Generally distributed in shady canyons, but not common. April-June.

5. **D. decorum patens** Gray. Occasional in canyons of the higher mountains.

6. **D. scopulorum glaucum** Gray. Bluff Lake, San Bernardino Mts. July.

7. **D. Parishii** Gray. Apparently limited to the Mohave and Colorado Deserts, the latter the type locality. April-May.

8. **D. recurvatum** Greene. Not uncommon on the Mohave Desert and adjacent mountains; San Bernardino Mts. May-July.

9. **D. cuyamacae** Abrams. Borders of Cuyamaca Lake, type locality. June.

10. ACTEA. Baneberry.

Perennial herbs with ample ternately compound leaves and small, white flowers in forked racemes; sepals 4, caducous; petals 1; stamens many; pistils 1 or 2, fruit a pea-sized berry, red or occasionally white.

1. **A. arguta** Torr. Occasional in the San Bernardino Mountains. July.

9. PAEONIA. Peony.

Robust glabrous and glaucous perennial with ternately or pinnately compound leaves and showy flowers; petals 5-6, brownish red; sepals round, concave; follicles 5.

1. **P. Brownii** Dougl. Scattered among the chaparral in our region. Feb.-May.

2. CERATOPHYLLACEAE. Hornwort Family.

Fragile submerged aquatics with whorled filiform leaves and minute, sessile, axillary, monoecious flowers without perianth, but surrounded by an 8-12-cleft persistent involucre; fertile flowers consisting of a simple 1-celled ovary, the sterile with 10-20 stamens, anthers sessile; fruit a smooth achene with a long, persistent beak.

1. CERATOPHYLLUM. Hornwort.

Characters of the family.

1. **C. demersum** L. Frequent in ponds and slow streams.

3. BERBERIDACEAE. Barberry Family.

Herbs or shrubs with alternate compound leaves and regular, perfect hypogonous flowers; sepals, petals and stamens in 2 circles of 3 in each; anthers opening by valves hinged at top; pistil 1; fruit a berry or a 1-celled capsule.

1. ODOSTEMON. Barberry.

Ours low evergreen shrubs or small trees with odd-pinnate coriaceous, prickly or spinose leaves, and yellow flowers in clustered terminal or axillary racemes; sepals 6, subtended by 3 or more bractlets; petals and stamens 6; fruit a red or black berry. *(Berberis.)*

Shrubs low.	
Leaflets undulate, markedly reticulate, deeply repand, rigidly spinose..................	1. *O. dictyota.*
Leaflets oblong or broadly ovate, and spinulose-dentate	2. *O. fascicularis.*
Shrubs tall, or small trees.	
Leaflets ovate to oblong, reticulate beneath, sinuately 1-4-toothed on each margin; bractlets minute	3. *O. Fremontii.*
Leaflets oblong-lanceolate, evenly spinulose-serrate; bractlets rather large; fruit secund.....	4. *O. Nevinii.*

1. **O. dictyota** Abrams. Sparingly distributed in the mountain foothills from San Diego through the San Gabriel and Santa Monica ranges to Seven Oaks. May.

2. **O. fascicularis** DC. Ranging with the last, but not so rare.

3. **O. Fremontii** Rydb. San Diego County, near its southern boundary.

4. **O. Nevinii** Abrams. Apparently limited to the sandy plains south and east of San Fernando. It sometimes attains the height of 5 m. The type was found by *Nevin* in the river bottom a short way above Buena Vista Bridge, the plant having probably been deposited there by the winter floods. This shrub is now near extinction. May.

4. LAURACEAE.

Aromatic trees and shrubs, completely distinguished by the minutely puncate, alternate, simple, entire leaves without stipules; perianth of 4-6 sepals imbricated in the bud; anthers opening by 1 or 2 uplifted valves to each cell; style and stigma single; ovary 1-celled becoming a berry-like fruit.

1. UMBELLULARIA. Mountain Laurel.

An evergreen tree with alternate thick, petioled leaves; flowers in peduncled umbels, yellowish green about 4 mm. long; sepals 6; stamens 9, the inner 3 with a 2-lobed stipitate gland on each side at the base, alternating with 3 ligulate staminodia; drupe reddish brown about 3 cm. long.

1. **U. californica** Nutt. Frequent in canyons of the coast range; San Bernardino and San Jacinto Mts.

ORDER PAPAVERALES.

- Sepals 2 or 3; endosperm present.
  - Flowers regular; stamens numerous............... 1. Papaveraceae.
  - Flowers irregular; stamens 6 (diadelphous)....... 2. Fumariaceae.
- Sepals 4, rarely more; endosperm wanting.
  - Capsules 2-celled; stamens 6, tetradynamous, rarely 2 or 4............................ 3. Brassicaceae.
  - Capsules 1-celled; stamens various.
    - Leaves compound; flowers showy; capsules with 2 parietal placentae.................. 4. Capparidaceae.
    - Leaves simple; flowers inconspicuous; capsules with 3-6 parietal placentae........... 5. Resedaceae.

1. PAPAVARACEAE. Poppy Family.

Herbs or shrubs, commonly with glaucous foliage and mostly 4-merous or 6-merous flowers; sepals 2 or 3; petals 4-6; stamens 6 to many; pistil compound and ovary becoming a capsule, or the carpels nearly distinct and pod like.

- Sepals 3; petals 6.
  - Herbs.
    - Flowers large, cream-colored; stamens many, petaloid .... 1. Platystemon.
    - Flowers small, white; stamens 6-12.......... 2. Platystigma.
    - Flowers small, white; stamens 6-9; plant minute, tufted .... 3. Canbya.
  - Shrubs; flowers large, white; capsule bristly...... 4. Romneya.
- Sepals 2; petals 4.
  - Shrubs; flowers yellow, capsule linear.......... 5. Dendromecon.
  - Herbs.
    - Flowers white, plant prickly throughout........ 6. Argemone.
    - Flowers red, plant glabrous.......... 7. Papaver.
- Sepals united to form a conical cap; flowers yellow or orange .... 8. Eschscholtzia.

1. PLATYSTEMON. Cream-cups.

A low villous pale green annual with linear entire leaves, alternate below, opposite above; flowers cream colored on long peduncles; sepals 3; petals 6; filaments flattened, petaloid; fruit of many indehiscent, torulose pods.

- Carpels without bristles.
  - Stems leafy below, villous.......... 1. *P. californicus.*
  - Stems subscapose, densely long silky haired....... 2. *P. crinitus.*
- Carpels with numerous bristles; leaves with a few scattered hairs .... 3. *P. hispidulus.*

1. **P. californicus** Benth. Common in warm soils of the lower hills. March-May.

2. **P. crinitus** Greene. Frequent in Tehachapi Mts., the type locality; Mohave Desert. April-May.

3. **P. hispidulus** Greene. Catalina Island; San Nicholas Island, type locality.

2. PLATYSTIGMA.

Low, slender glabrous annuals with linear entire or denticulate leaves and small, white flowers; carpels 3 united into a 1-celled dehiscent capsule.

1. **P. denticulatum** Greene. Occasional in shady places in the foothills; Temecula Canyon, San Diego Co., type locality.

3. CANBYA.

Minute glabrous acaulescent annuals with linear entire leaves crowded at the base; petals white, minute; stigmas 3; capsule globose.

1. **C. candida** Parry. Mohave Desert and northward through Inyo Co. April-May.

4. ROMNEYA. Matilija Poppy.

A many stemmed, tall, glabrous, light green shrub with pinnately divided, alternate leaves and very large white flowers; sepals 3; petals 6; capsule oblong, densely setose.

Sepals glabrous, beaked.	1. *R. Coulteri.*
Sepals hispid, beakless or with an inconspicuous beak.	2. *R. trichocalyx.*

1. **R. Coulteri** Harv. Occasional from the Puente and Santa Ana hills south to Lower California.

2. **R. trichocalyx** Eastw. From the Santa Maria River south along the coast ravines to San Diego Co. May-June.

5. DENDROMECON. Tree Poppy.

Tall shrubs with alternate coriaceous leaves and solitary, rather large, yellow flowers; sepals 2; petals 4; stamens many; stigmas 2; capsule long linear, 1-celled.

Leaves rigid, ovate lanceolate, margins erose or denticulate	1. *D. rigidum.*
Leaves less rigid, broadly ovate or obovate, margins entire	2. *D. Harfordii.*

1. **D. rigidum** Benth. Frequent in sand washes and in the lower chaparral belt. May-July.

2. **D. Harfordii** Kell. Santa Barbara and the channel islands. From lack of material we have treated as a synonym Prof. Greene's *D. flexilis.* On Catalina Island this plant attains a height of 10-20 ft. with a diameter of 6-12 inches; this is probably Greene's *D. arborea.*

6. ARGEMONE. Prickly Poppy.

Ours spiny stemmed annuals with ovate or pinnatifid prickly leaves and large, pure white flowers; stamens many; fruit a 4-valved capsule.

Petals over 30 mm. long; leaves sinuate or pinnatifid.	1. *A. platyceras.*
Petals 15 mm. long; leaves nearly orbicular, repand.	2. *A. corymbosa.*

1. **A. platyceras hispida** Prain. Frequent on dry plains and sand washes. June-August.

2. **A. corymbosa** Greene. Mohave Desert, type locality. June-July.

7. PAPAVER. Poppy.

Ours annual with mostly glabrous pinnatifid lobed or dissected leaves and showy red or scarlet flowers on long peduncles; sepals 2; petals 4; capsule opening below the stigma by pores or valves.

Stigma sessile and radiate upon the summit of the ovary .... 1. *P. californicum.*
Stigma capitate upon the short style............ 2. *P. heterophyllum.*

1. **P. californicum** Gray. Western Poppy. Foothills around Los Angeles and Pasadena on burned areas. April-June.

2. **P. heterophyllum** Greene. Mostly solitary plants in the foothills, not common. March-April.

8. ESCHSCHOLTZIA. California Poppy.

Low, commonly glabrous annuals with petioled leaves dissected into narrow lobes; flowers yellow or orange, peduncled; sepals united to form a cap which separates from a dilated torus which bears the petals; stamens many; capsules elongated, terete.

Perennial.
  Torus with a broad rim; stamens 40 or more.
  Herbage glabrous .... 1. *E. peninsularis.*
  Herbage cinereous-puberulent, white with bloom .... 2. *E. maritima.*
Annuals.
 Torus without rim; stamens fewer.
  Petals more than 15 mm. long; herbage glabrous .... 3. *E. vernalis.*
  Petals 15 mm. or less.
   Plant glabrous, leafy throughout; insular species .... 4. *E. ramosa.*
   Plant pubescent below.................. 5. *E. hypecoides.*
   Plant acaulescent, glabrous, glaucous; seeds pitted .... 6. *E. glyptosperma.*
  Petals 2 mm. long......................... 7. *E. minutiflora.*
  Petals 6-10 mm. long..................... 8. *E. Parishii.*

1. **E. peninsularis** Greene. Foothills Sierra Madre and Chatsworth Park. March-May.

2. **E. maritima** Greene. San Miguel Island, type locality.

3. **E. vernalis** Greene. The common poppy of southern California. March-May.

4. **E. ramosa** Greene. San Clemente and the Santa Barbara Islands.

5. **E. hypecoides** Benth. Santa Monica Mountains, *Abrams.*

6. **E. glyptosperma** Greene. Palm Springs and neighborhood; Mohave Desert, type locality. April.

7. **E. minutiflora** Wats. Colorado and Mohave Deserts. April-May.

8. **E. Parishii** Greene. Colorado Desert. April.

2. FUMARIACEAE. Fumitory Family.

Glabrous herbs with watery juice and alternate pinnate or dissected leaves, without stipules, and with racemose flowers; sepals 2; petals 4, in 2 dissimilar pairs; stamens 6, in 2 groups of 3 each opposite the petals; capsule 1-celled, dehiscent by 2 valves or indehiscent.

1. BICUCULLA. Dutchman's Breeches. Ear-drops.

Glabrous perennials with ternately or pinnately compound leaves and racemose or paniculate yellow or ochroleucous flowers; corolla flattened and cordate the 2 outer petals larger, saccate or spurred at the base. *(Dicentra.)*

Flowers yellow .... 1. *B. chrysantha.*
Flowers ochroleucous .... 2. *B. ochroleuca.*

1. **B. chrysantha** Coville. Fairly common in dry, rocky soils in the chaparral belt. June-July.

2. **B. ochroleuca** Heller. Rare and local in sand washes near Encino and on both slopes of the Santa Monica Mts., the north slope the type locality. May.

3. BRASSICACEAE. Mustard Family.

Herbaceous annuals, biennials or perennials with alternate leaves and flowers mostly in terminal racemes; sepals 4, deciduous; petals 4, rarely wanting; stamens 6, tetradynamous, rarely 2 or 4; ovary 2-celled by a thin partition, rarely 1-celled; fruit a silique or silicle. *(Cruciferae.)*

Pods indehiscent.
  Flowers yellow or purplish; pods nodose..........13. Raphanus.
  Flowers purplish; pods 2-jointed.................12. Cakile.
  Flowers white (one *Dithyrea* purple.)
    Pods didymous, very small......................8. Coronopus.
    Pods didymous, large, orbicular................6. Dithyrea.
    Pods obovate, wingless.........................3. Athysanus.
    Pods orbicular, winged.........................2. Thysanocarpus.
Pods dehiscent.
  Pods stipitate.
    Stipe long, slender............................32. Stanleya.
    Stipe short, stout.............................30. Thelypodium.
  Pods not stipitate.
    Pods nearly globular.
      Plants aquatic...............................9. Subularia.
      Plants terrestrial...........................5. Lesquerella.
    Pods short.
      Pods compressed contrary to the partition.
        Flowers white.
          Pods heart-shaped........................10. Bursa.
          Pods elliptic; plants delicate...........11. Hutchinsinia.

Flowers yellow; pods obovoid, margined; leaves sagittate-clasping ....24. CAMELINA.
Flowers white or yellow.
Pods orbicular or ovate, notched at the apex (*L. virginica* excepted.).......... 7. LEPIDIUM.
Pods compressed parallel to the partition.
Pods orbicular, flowers white.................... 4. KONIGA.
Pods ovate or oblong, frequently twisted........ 1. DRABA.
Pods elongate, if compressed, parallel to the partition.
Valves nerveless; cauline leaves petioled.
Flowers purplish; roots tuberous............27. DENTARIA.
Flowers white; roots fibrous..................26. CARDAMINE.
Valves 1-nerved; cauline leaves sessile.
Petals flat ....28. ARABIS.
Petals twisted or undulate-crisped.
Pods mostly terete........................29. CAULANTHUS.
Pods compressed ....31. STREPTANTHUS.
Pods terete or 4-angled, not at all compressed.
Pods short, less than 4 cm. long.
Pods beaked; petals yellow...................14. BRASSICA.
Pods beakless.
Petals white; plants aquatic................20. SISYMBRIUM.
Petals yellow.
Leaves elliptical, clasping by a cordate base ....25. CONRINGIA.
Leaves finely dissected..................16. SOPHIA.
Leaves sinuate lobed or pinnatifid; flowers about 1 cm. broad.....................15. DIPLOTAXIS.
Leaves lyrate-pinnatifid.
Terminal lobe of leaf much longer than broad; pods 1.5 cm. long on slender pedicels ....22. RADICULA.
Terminal lobe of leaf usually as broad as long; pods about 3 cm. long on very stout pedicels ....23. CAMPE.
Pods more than 4 cm. long; flowers yellow.
Leaves runcinate-pinnatifid; plant hairy; fruit adpressed to the stem; flowers small...19. ERYSIMUM.
Leaves entire or sparingly toothed; flowers over 12 mm. long.....................18. CHEIRANTHUS.
Leaves, the upper ones pinnately divided into linear lobes; pods long slender, 1 mm. thick ....21. NORTA.
Pods compressed, flat, one species partly obcompressed; racemes leafy.................17. TROPIDOCARPUM.

1. DRABA. WHITLOW GRASS.

Annual or perennial herbs with alternate, entire or toothed leaves and white or yellow flowers in crowded racemes; petals entire, emarginate or toothed; pods oval oblong, or linear, flattened parallel to the septum; seeds in 2 rows in each cell.

Annual, flowers white.
  Leaves toothed.
    Pod hispid with simple hairs; racemes elongated. 1. *D. cuniefolia.*
    Pod pubescent with stellate hairs; racemes nearly sessile .... 2. *D. sonorae.*
  Leaves entire; pods glabrous.................... 3. *D. integrifolia.*
Perennial; flowers yellowish or yellow; pods usually contorted.
  Stems leafy.
    Petals toothed at tip, shorter than the sepals.... 4. *D. vestita.*
    Petals rounded at the tip, longer than the sepals 5. *D. corrugata.*
  Stems not leafy.............................. 6. *D. saxosa.*

1. **D. cuniefolia** Nutt. Occasional in sandy soil in the foothills of the coast and the interior. March-May.

2. **D. sonorae** Greene. Chollas Valley, San Diego Co., type locality. This is the common form found in the southern counties.

3. **D. integrifolia** Wats. Foothills near Pasadena; Santa Monica, *Hasse;* San Bernardino, *Parish.*

4. **D. vestita** Davidson. Occasional at high altitudes in the San Antonio range, Mt. San Antonio, type locality. July.

5. **D. corrugata** Wats. Mt. San Gorgonio, type locality. July.

6. **D. saxosa** Davidson. Summit of Mt. San Jacinto. July.

2. THYSANOCARPUS. Lace Pod.

Slender, erect, nearly glabrous annuals with subsimple or branched stems, dentate leaves and minute white flowers on elongated racemes; pod indehiscent, 1-celled, 1-seeded, orbicular plano-convex, the encircling wing with radiating nerves or perforations; pedicels recurved.

Pod orbicular; upper leaves sagittate-auriculate.
  Wing of pod entire or crenate.................. 1. *T. curvipes.*
  Wing of pod perforated........................ 2. *T. elegans.*
Pod ovate or elliptic; upper leaves not auriculate..... 3. *T. laciniatus.*

1. **T. curvipes** Hook. Frequent on grassy slopes. March-April.

2. **T. elegans** Greene. Tehachapi Mountains. May.

3. **T. laciniatus** Nutt. Occasional on shaded slopes of the lower ranges throughout the south. March-April.

3. ATHYSANUS.

Slender diffuse annual, leafy only near the base, the leaves simple, toothed; flowers unilateral on capillary stems; petals white minute or wanting; stamens 6; pods hispid with hooked hairs, orbicular, indehiscent, 1-seeded; pedicels short and recurved.

1. **A. pusillus** Greene. Widely distributed on foothill slopes and desert sands, but not common. Feb.-April.

4. KONIGA. Sweet Alyssum.

Perennial herbs with simple, pubescent, entire leaves and small white flowers in terminal racemes; petals obovate, entire; filaments enlarged below; capsule orbicular, flattened, 2 mm. broad; cells 1-seeded. *(Lobularia.)*

1. **K. maritima** Desv. An occasional garden escape on streets and wastes.

5. LESQUERELLA.

Ours, herbaceous annuals, lepidote-hoary, with entire leaves, yellow or white flowers and globose, glabrous, commonly short stipitate pods, tipped with a long style; pedicels curved.

Flowers yellow.
  Pods glabrous, stipitate.............................. 1. *L. Gordoni.*
  Pods pubescent, not stipitate...................... 2. *L. Palmeri.*

1. **L. Gordoni** Wats. Near Little Rock, Mohave Desert.

2. **L. Palmeri** Wats. Bear Valley, *Parish;* Canyon Springs, Colorado Desert, *Hall.*

6. DITHYRAEA. Spectacle Pod.

Erect branching, tomentose annuals with thickish, ovate or orbicular, subentire or coarsely toothed leaves and dense racemes of white or purplish flowers; pods laterally flattened, each cell nearly orbicular, indehiscent but separating at maturity from the persistent septum.

Petals white; basal leaves thick, ovate, coarsely toothed .... 1. *D. californica.*
Petals purplish; basal leaves fleshy, orbicular, subentire .... 2. *D. maritima.*

1. **D. californica** Harv. Mohave and Colorado Deserts. April.

2. **D. maritima** Davidson. Catalina Island; sand dunes from Santa Monica to Redondo, the latter the type locality. April-May.

7. LEPIDIUM. Peppergrass.

Low annuals or perennials with pinnatifid or toothed leaves and mostly small, white or apetalous flowers; stamens 2 or 4; capsule orbicular or ovate, emarginately 2-winged at apex, strongly compressed contrary to the septum.

Styles conspicuous.
Capsule pointed; flowers white .... 1. *L. draba.*
Capsules bifid or retuse.
Annuals; flowers yellow .... 2. *L. flavum.*
Perennials; flowers white .... 3. *L. Fremontii.*
Style short; capsule emarginate; stem leaves broadly auriculate .... 4. *L. perfoliatum.*
Styles none.
Capsules emarginate.
Pedicels terete.
Plant erect, stems simple.
Basal leaves pinnate or pinnatifid, nearly glabrous .... 5. *L. medium.*
Basal leaves oblanceolate, toothed, pubescent. 6. *L. bernardinum.*
Plant branching from the base.
Basal leaves pinnatifid with linear divisions, pubescent .... 7. *L. Menziesii.*
Pedicels flattened.
Plant spreading, hirsute throughout; pod pubescent .... 8. *L. lasiocarpum.*
Plant erect, pubescent only on lower stem; pod glabrous .... 9. *L. nitidium.*
Capsule reticulated, 2-toothed at apex.
Teeth of capsule divergent .... 10. *L. acutidens.*
Teeth erect.
Leaves pinnatifid; pods coarsely pubescent .... 11. *L. latipes.*
Leaves linear or few-toothed; pod glabrous in age .... 12. *L. dictyotum.*
Leaves pinnatifid; pod glabrous, inconspicuously reticulated .... 13. *L. strictum.*

1. **L. draba** L. Grain fields at Chino; vegetable gardens, Huntington Beach; Los Angeles, 1910.

2. **L. flavum** Torr. Common in subalkaline spots on the Mohave and Colorado Deserts. May.

3. **L. Fremontii** Wats. Ranges with the last. May.

4. **L. perfoliatum** L. Casual at Annandale; Orange; Hollywood, 1910.

5. **L. medium** Greene. Common and generally distributed along waysides. March-May.

6. **L. bernardinum** Abrams. Bear Valley, San Bernardino Mts. June.

7. **L. Menziesii** DC. Colorado Desert. April.

8. **L. lasiocarpum** Nutt. Occasional in the foothills near Los Angeles; San Diego. April.

9. **L. nitidium** Nutt. Common on grassy slopes, Feb.-April.

10. **L. acutidens** Gray. Occasional in alkaline soils on the coastal plains. April.

11. **L. latipes** Hook. In saline places near the coast; not common. April.

12. **L. dictyotum** Gray. Mohave and Colorado Deserts. April.

13. **L. strictum** Rattan. San Diego and San Bernardino, *Greene.* March-June.

8. CORONOPUS. Wart Cress.

Diffuse prostate heavy scented annuals with hirsute pinnatifid leaves, narrowly segmented, and numerous greenish white flowers; pods subglobose, small, didymous and strongly reticulated.

1. **C. didymus** Smith. Occasional casual in the streets of Los Angeles and Pasadena, 1895.

9. SUBULARIA. Awlwort.

A dwarf stemless aquatic with tufted subulate leaves, few minute white flowers and oblong, short-stipitate capsules.

1. **S. aquatica** L. Edges of ponds, San Diego, *Orcutt.*

10. BURSA. Shepherd's-purse.

Branching annuals with a rosette of narrow pinnatifid leaves, small white flowers and a triangular, emarginate capsule, flattened contrary to the partition.

1. **B. bursa-pastoris** Web. A common springtime weed on city streets and wastes. Native of Europe.

11. HUTCHINSINIA.

Low delicate annuals with pinnately lobed or entire leaves and small white flowers in terminal racemes; pod oval, obcompressed.

Leaves pinnately divided, pedicels with sparse stellate hairs	1. *H. procumbens.*
Leaves mostly entire; pedicels glabrous	2. *H. desertorum.*

(*Capsella* in part.)

1. **H. procumbens** Desv. In subalkaline sands on the coast. April.

2. **H. desertorum** Davidson. Desert sands; Little Lake, Inyo County; Mohave Desert; Del Sur, type station. April-May.

12. CAKILE. Sea Rocket.

Fleshy maritime annuals with obovate crenate leaves and small purplish flowers; pod of 2 unequal joints each 1-seeded.

1. **C. americana** Nutt. Sea shore sands, Newport and adjoining coast. April-May.

13. RAPHANUS. Radish.

Stout annuals with lyrately pinnatifid leaves and yellow or purplish flowers; pods thick, elongated, indehiscent.

Flowers purplish; pod thick, spongy, 2-3-seeded. 1. *R. sativus.*
Flowers yellow; pod moniliform, 4-10-seeded......... 2. *R. raphanistrum.*

1. **R. sativus** L. Radish. A well established weed occupying acres of ground on the Los Angeles seaboard. Feb.-Aug. Native of Europe.

2. **R. raphanistrum** L. Once found on a Los Angeles street in 1902; not since seen.

14. BRASSICA. Mustard.

Tall, coarse, branching annuals with lyrate pinnatifid basal leaves, and yellow flowers in elongated racemes; capsules narrow, terete, or quadrangular; seeds in 1 row in the cell.

Upper leaves with clasping auricled base; plants glabrous or nearly so.................. 1. *B. campestris.*
Upper leaves not clasping.
  Pods glabrous, adpressed, beak slender; flowers yellow .... 2. *B. nigra.*
  Pods glabrous, adpressed, beak blunt; flowers lemon yellow .... 3. *B. adpressa.*
  Pods densely hispid, spreading; flowers yellow..... 4. *B. alba.*

1. **B. campestris** L. Turnip. Rutabaga. Common in fields and waysides. March-June.

2. **B. nigra** Koch. Black Mustard. All too common in grain fields. In heavy adobe soils it forms dense thickets 6-8 feet high. March-May. An early introduction.

3. **B. adpressa** Boiss. Now widespread and abundant in the neighborhood of Los Angeles, favoring the light sandy soils of the interior; it commences flowering as *B. nigra* passes and flowers till late autumn. It has become perennial in habit. Los Angeles Streets. 1909.

4. **B. alba** Boiss. Gathered by *Hasse* at Santa Monica in 1890 but not since collected.

15. DIPLOTAXIS. Sand Rocket.

Perennial glabrous herb with pinnatifid narrow lobed leaves and rather large, yellow flowers in terminal racemes; pod elongated, linear, flattened, beaked; seeds in 2 rows in each cell.

1. **D. tenuifolia** d DC. Occasional, Redondo; Pasadena; Santa Ana; Los Angeles streets, 1893.

16. SOPHIA. Tansy Mustard.

Annual or perennial herbs canescent with short forked hairs, leaves finely dissected; flowers small, yellow, in terminal racemes, much elongated in fruit; pods short, slender pedicelled. *(Sisymbrium in part.)*

Leaves finely dissected, segments deeply toothed, canescent; seeds in 2 rows............ 1. *S. canescens.*

Leaves less dissected, segments incisely serrate, glandular hairy; seeds in 1 row........ 2. *S. incisum.*

1. **S. canescens** Nutt. In dry places on the hill slopes. April-June.

2. **S. incisum** Engelm. On the borders of alkaline flats in the mountains. June-July.

17. TROPIDOCARPUM.

Low spreading pubescent annuals with pinnately divided leaves and loose leafy-bracted racemes of medium sized yellow flowers; pods linear, flattened laterally or only partially flattened, with partitions wanting.

Pods glabrous.
  Pods obcompressed at apex only.............. 1. *T. dubium.*
  Pods obcompressed throughout, pedicels 10 mm. or more long...................... 2. *T. gracile.*
Pods pubescent, pedicels less than 10 mm. long... 3. *T. scabriusculum.*

1. **T. dubium** Davidson. Frequent in the neighborhood of Los Angeles; Hollywood hills, type locality. April-May.

2. **T. gracile** Hook. Common in the interior valleys.

3. **T. scabriusculum** Hook. Mohave Desert.

18. CHEIRANTHUS. Western Wallflower.

Coarse biennials or perennials with harsh pubescence of branched adpressed hairs; alternate, simple, entire or toothed leaves and large yellow flowers in long terminal racemes; sepals, one pair saccate; pods subterete or 4-sided, ascending. *(Erysimum.)*

Pods 4-angled, flattened parallel to the partition.
  Calyx lobes 10-12 mm. long; racemes long..... 1. *C. angustatus.*
  Calyx lobes 6-7 mm. long; racemes short...... 2. *C. suffrutescens.*
Pods 4-angled, slightly flattened parallel to the partition; petals 15-20 mm. long...... 3. *C. asper.*

1. **C. angustatus** Greene. Occasional in the foothills of the Santa Monica and Santa Ana Mts., *Abrams.*

2. **C. suffrutescens** Abrams. Common on the sand dunes along the coast, flowering nearly the whole season.

3. **C. asper** Nutt. Common and widely distributed in the mountains up to 3,000 m.

19. ERYSIMUM.

Erect much branched hairy annual with runcinately pinnatifid leaves and small yellow flowers in elongated spikes; pods nearly sessile, erect and closely adpressed to the stem.

1. **E. officinale** L. (Sisymbrium officinale Scop.) Hedge mustard. Not infrequent in waste grounds; in some places abundant. San Bernardino, 1885.

20. SISYMBRIUM. Water Cress.

A perennial glabrous herb growing in water or wet places with pinnately divided leaves and small white flowers in terminal racemes; pods linear-oblong, on slender pedicels; seeds in 2 rows in each cell.

1. **S. nasturtium-aquaticum** L. (Nasturtium officinale L.) Very common in streams and marshy places. May-Oct.

21. NORTA.

Upright branching annual with broad pinnatifid leaves below and linear divided ones above; flowers yellow, about 12 mm. long; pods narrowly linear, 1 mm. wide and 5-10 cm. long, divergent. *(Sisymbrium.)*

1. **N. altissima** L. Tumble mustard. Now widely distributed in cultivated fields and along waysides; Hollywood, 1909.

22. RADICULA. Yellow Cress.

Herbs with simple or pinnately lobed, dissected or rarely entire leaves and small yellow flowers; pods terete, less than 1.5 cm. long on slender pedicels; seeds in 2 rows in each cell.

Leaves lacinate toothed or pinnatifid............ 1. *R. curvisiliqua.*
Leaves lyrately pinnatifid........................ 2. *R. obtusa.*

1. **R. curvisiliqua** Greene. Occasional on the margins of shallow pools.

2. **R. obtusa** Greene. Bluff Lake, *Parish.*

23. CAMPE. Winter Cress.

A somewhat succulent erect biennial with angled stems, pinnatifid leaves and yellow flowers; pods linear, rigid, on very stout pedicels; seeds in 1 row in each cell. *(Barbarea.)*

1. **C. barbarea** Wight. Yellow Rocket. Occasional along streams in the coast range; more common in the pine belt. April-June.

24. CAMELINA. False Flax.

Erect simple or slightly branched annual with glabrous, mostly entire leaves, those of the stem sessile and clasping by a sagittate base; flowers small, yellowish; pods 6-8 mm. long, pyriform, margined and slightly flattened.

1. **C. sativa** L. Roadside, Glendale, 1920. *Mrs. Rothwell.* Redondo, 1897.

25. CONRINGIA. Hares'-ear Mustard.

Glabrous annual with deeply cordate amplexicaul leaves, yellowish white flowers and long wide-spreading acute and rather sharp 4-angled pods; seeds 1-rowed in the cells.

1. **C. perfoliata** Link. Upland, 1917, *Johnston.*

26. CARDAMINE

Annuals or perennials in woods or moist places, with fibrous or running rootstocks, simple or lobed leaves, and white or purplish flowers in short racemes; pods linear, flat, beaked or pointed.

Petals 6-8 mm. long; leaflets linear, few toothed.... 1. *C. Gambellii.*
Petals 2 mm. long; leaflets roundish, 3-5-toothed..... 2. *C. oligosperma.*

1. **C. Gambellii** Wats. Marshes and sluggish streams. March-Oct.

2. **C. oligosperma** Torr. Topango Canyon, *Hasse.* March.

27. DENTARIA. Toothwort. Pepper-root.

Distinguished from *Cardamine* by the tuberous roots, simpler stems and larger flowers.

1. **D. californica** Nutt. Not uncommon in shady canyons. April-May.

28. ARABIS. Rock Cress.

Erect annuals, biennials or perennials, glabrous or pubescent, with entire or toothed leaves, more or less rosulate at the base, the cauline smaller, sessile or clasping; flowers white, rose-colored or purplish; pods long linear, flattened parallel to the septum; valves 1-nerved.

Flowers white, small.
  Pods spreading; basal leaves lyrate-pinnatifid, nearly glabrous .... 1. *A. virginica.*

Flowers yellowish-white, small.
Pods erect; basal leaves oblanceolate, glabrous, upper leaves auriculate................ 2. *A. glabra.*
Flowers pink, rose-colored or purplish red.
Pods ascending.
Leaves entire, oblanceolate, finely stellate-pubescent; pods more than 2 mm. broad, seeds in 1 row............................ 3. *A. platysperma.*
Leaves small, entire, oblanceolate, stellate-pubescent; pods 2 mm. broad; seeds in 2 rows 4. *A. Parishii.*
Leaves pinnately divided into filiform segments.. 5. *A. filifolia.*
Pods arcuate.
Leaves narrow linear-oblanceolate, roughly stellate-pubescent; cauline leaves auricled but not clasping .... 6. *A. arcuata.*
Leaves oblanceolate, entire, pubescent, cauline leaves clasping .... 7. *A. Beckwithii.*
Leaves narrow, obovate to oblanceolate, cauline leaves narrowed to a winged petiole... 8. *A. repanda.*
Pods pendulous.
Leaves long, linear.......................... 9. *A. pulchra.*
Leaves broadly spatulate to narrow oblanceolate.. 10. *A. perennans.*

1. **A. virginica** L. Inglewood, *Abrams;* Point Loma, *Cleveland.* April.

2. **A. glabra** Bernh. Tower Mustard. Growing usually as single plants from the coast to the streams of the basal pine zone. April-July.

3. **A. platysperma** Gray. At subalpine elevations, Ontario Peak, *Johnston;* Mt. San Antonio, *Burlew;* Bear Valley. July.

4. **A. Parishii** Wats. Bear Valley, type locality.

5. **A. filifolia** Greene. Common in two localities on Catalina, *Trask.* March-April.

6. **A. arcuata** Gray. On dry, rocky hills of the lower Transition Zone. May-June.

7. **A. Beckwithii** Wats. San Bernardino Mts.

8. **A. repanda** Wats. Occasional in the San Bernardino, San Jacinto and Tehachapi Mts. July.

9. **A. pulchra** Jones. Colorado and Mohave Deserts. May-June.

10. **A. perennans** Wats. San Bernardino and San Jacinto Mts.; Colorado and Mohave Deserts. June-July.

29. CAULANTHUS.

Coarse, glabrous biennial or perennial herbs with mostly simple leaves and dark, purple or purplish flowers; petals undulate-crisped, with a broad claw and small or obsolete blade; capsule narrowly linear, subterete and somewhat flattened.

Stems glabrous; pods ascending; flowers dark purple.
  Basal leaves sinuate dentate, cauline leaves broadly cordate clasping .... 1. *C. amplexicaulis.*
  Basal leaves oblanceolate, lyrate pinnatifid; cauline leaves small, linear, not clasping....... 2. *C. crassicaulis.*
Stems hirsute-pubescent; pods deflexed; flowers light purple.
  Basal leaves oblanceolate, dentate; cauline leaves triangular, dentate, sessile............ 3. *C. Coulteri.*

1. **C. amplexicaulis** Wats. Common in the mountains at about 1,500 meters altitude. May-June.

2. **C. crassicaulis major** Jones. Cushenberry Canyon, San Bernardino Mts., *Parish.* Big Rock Creek, Mohave Desert. July.

3. **C. Coulteri** Wats. Fort Tejon; hills near Manzana and Elizabeth Lake. May.

30. THELYPODIUM.

Annuals or biennials with entire, toothed or pinnatifid, mostly glabrous leaves; and purple or white, rarely yellow, flowers; petals flat, long and narorw, with a well developed blade; anthers curved or coiled; pods slender, terete or quadrangular.

Stems glabrous.
  Petals purple.
    Basal leaves oblong, few-toothed; cauline auriculate, clasping; pods arcuate... 1. *T. Cooperi.*
  Petals white or roseate.
    Cauline leaves sagittate-auriculate; pods suberect .... 2. *T. stenopetalum.*
    Cauline leaves linear; inflorescence crowded; pods spreading .... 3. *T. affine.*
Stems hispid below; flowers yellowish-white.
  Plant tall, flexuous; basal leaves toothed or pinnatifid; pods deflexed........... 4. *T. lasiophyllum.*
  Plant smaller, rigid; pods erect............... 5. *T. inalienum.*

1. **T. Cooperi** Wats. Mohave and Colorado Deserts. April-June.

2. **T. stenopetalum** Wats. Bear Valley, San Bernardino Co.; type locality. July.

3. **T. affine** Greene. Mohave and Colorado Deserts. May-June.

4. **T. lasiophyllum** Greene. Common and widely diffused as isolated plants. April-May.

5. **T. inalienum** Robinson. Foothills from Santa Barbara to Los Angeles; not common. March-April.

31. STREPTANTHUS.

Annual or perennial herbs with simple or simply pinnatifid leaves and white or purple flowers; petals narrow, linear with well developed blade; capsule narrowly linear.

Perennial or biennial, glabrous or very nearly so.
Calyx regular, petals purplish; basal leaves spatulate, toothed in upper half; pod spreading .... 1. *S. campestris.*
Calyx irregular; petals greenish-white; leaves as in the last..:.................... 2. *S. bernardinus.*
Annual.
Stems pubescent; flowers yellowish white or purple.
Basal leaves pinnatifid; pods reflexed; pedicels hirsute .... 3. *S. heterophyllus.*
Stems glabrous; flowers white or roseate.
Basal leaves ovate-spatulate, cauline narrow linear; pods pendulous............... 4. *S. longirostris*
Basal leaves oblong, cauline triangular auriculate; stem inflated, fistulous....... 5. *S. inflatus.*

1. **S. campestris** Wats. Campo, San Diego Co., type locality.

2. **S. bernardinus** Greene. Common around Bear Valley, the type locality; San Jacinto Mt. June.

3. **S. heterophyllus** Nutt. Widely distributed from foothill to high mountains, very variable in foliage and coloration. May-July.

4. **S. longirostris** Wats. Not infrequent on the Mohave Desert. May-June.

5. **S. inflatus** Greene. Mohave Desert, common. April-May.

32. STANLEYA.

Tall glabrous perennials with entire toothed or pinnatifid leaves and numerous yellow flowers in terminal racemes; flower buds elongated clavate; pods linear, long stipitate, spreading.

1. **S. pinnata** Britt. Occasional along the coast and in the foothills of the interior.

4. CAPPARIDACEAE. CAPER FAMILY.

Herbs or shrubs with more or less heavy-scented and pungent-flavored herbage, alternate, simple or compound leaves and complete flowers in bracted racemes; sepals 4; petals 4; stamens 6 or more; ovary and fruit commonly stipitate, composed of 2 closely united carpels; fruit a capsule or berry.

Shrubs; capsule inflated.......................... 1. ISOMERIS.
Herbs.
Capsule oblong or linear; leaflets 3-7, large....... 2. CLEOME.
Capsule rhomboidal, 2-horned or globular; leaflets 3-foliolate, small .... 3. CLEOMELLA.
Capsule didymous, 2-celled, the cells separating as small 1-seeded nutlets.................
Stamens exserted; pod on long stipe............ 4. WISLIZENIA.
Stamens not exserted; pod on short stipe....... 5. OXYSTYLIS.

1. ISOMERIS. BLADDERPOD.

A rigid-stemmed nearly glaucous shrub with 3-foliolate leaves and rather large yellow flowers in short bracteate, terminal racemes; calyx persistent, 4-cleft; petals 4, sessile; stamens 6; pod oval, inflated, coriaceous, tardily 2-valved.

Capsule much inflated.
Capsule attenuate at base....................... 1. *I. arborea.*
Capsule globose, not attenuate at base............ 2. *I. globosa.*
Capsule scarcely inflated, oblong, attenuate at both ends .... 3. *I. angustata.*

1. **I. arborea** Nutt. Fairly common on the coast from Santa Barbara to San Diego and on the borders of the desert. Feb.-July.

2. **I. globosa** Coville. Sespe Creek and vicinity of Fort Tejon, *Abrams.*

3. **I. angustata** Parish. Mohave and Colorado Deserts. Vicinity of Palm Springs, type locality.

2. CLEOME.

Ours, erect annuals with 3-7-foliolate leaves and yellow flowers, and oblong or linear, 2-valved pods; other characters as in *Isomeris.*

1. **C. lutea** Hook. Field near Downey. 1894. May.

3. CLEOMELLA.

Habit of *Cleome;* flowers smaller; leaves 3-foliate; pod short and few-seeded, ovoid or rhomboidal, the valves often produced laterally into horn-like appendages.

Plant glabrous.
Stipe longer than pod; stamens much exserted; pod slightly rhomboidal .... 1. *C. oocarpa.*
Stipe shorter than pod; stamens not exserted.
Pedicels 12 mm. long; pod obovate.............. 2. *C. parviflora*
Pedicels 2 mm. long; pod globose.............. 3. *C. brevipes.*
Plants pubescent or hirsute.
Stamens exserted.
Sepals lacinate; pod pubescent.................. 4. *C. obtusifolia.*
Sepals simple; pod hirsute..................... 5. *C. pubescens.*

Stamens not exserted; pod birostrate, twice as long as broad .... 6. *C. taurocranos.*

1. **C. oocarpa** Gray. Mohave Desert. May.

2. **C. parviflora** Gray. Northern part of the Mohave Desert.

3. **C. brevipes** Wats. Camp Cady, Mohave Desert, *Parish.*

4. **C. obtusifolia** T. & F. Frequent near Lancaster and elsewhere on the Mohave Desert. May-July.

5. **C. pubescens** Nels. Lancaster; Mohave Desert, type locality.

6. **C. taurocranos** Nels. Colorado Desert, type locality.

4. WISLIZENIA.

Erect and branching glabrous annuals with densely racemose yellow flowers; filiform stipe in fruit refracted on the pedicel.

Leaves trifoliate .... 1. *W. refracta.*
Leaves simple .... 2. *W. Palmeri.*

1. **W. refracta** Engl. On the Arizona border. July.
2. **W. Palmeri** Gray. Near the mouth of the Colorado.

5. OXYSTYLIS.

Glabrous annuals with 3-foliolate long-petioled leaves, and
little surpassing the petals; ovary with short stout stipe.
flowers in sessile clusters in the axils; petals yellow; stamens

1. **O. lutea** T. & F. Colorado Desert.

5. RESEDACEAE. MIGNONETTE FAMILY.

Annual or perennial herbs with alternate leaves, gland-like stipules and terminal racemes or spikes of small, often fragrant flowers; sepals 4-7, unequal, persistent; petals 2-6, lacinate or dentate; stamens 3-40, borne on the base of the calyx or on a dilated nectariferous and oblique disk, declined or unilateral; ovary 1, composed of 3-6 carpels, distinct at the tips; fruit a capsule.

Petals 4; disk present.............................. 1. RESEDA.
Petals 2; disk wanting.............................. 2. DIPETALIA.

1. RESEDA. MIGNONETTE.

Herbs with entire, lobed or pinnate leaves with spikes of small greenish flowers; petals 5-6 cleft; stamens 8-30; capsule 3-6-lobed.

1. **R. alba** L. Streets of Pasadena, 1893. Locally abundant north of Santa Susanna Pass. *R. odorata* the common garden

mignonette may occasionally be found, but seemingly never established. June.

2. DIPETALIA.

Ours, low glaucous erect annuals with numerous linear entire leaves and leafless terminal spikes of small white flowers; sepals 4; petals 2, entire or lobed; stamens 3-8; pod 4-beaked about 3 mm. in diameter, opening at the summit.

1. **D. subulata** Kuntze. (Oligomeris glaucescens Camb.) In saline soils near the coast and in sandy soils on the deserts. April-May.

ORDER ROSALES.

Flowers regular or nearly so.
Endosperm present, usually copious and fleshy; stipules mostly wanting.
Herbs.
Carpels as many as the sepals; plants succulent 1. CRASSULACEAE.
Carpels fewer than the sepals.
Staminodia present; carpels 3 or 4, wholly united into a 1-celled gynoecium........ 2. PARNASSIACEAE.
Staminodia wanting; carpels mostly 2, distinct or partially united.............. 3. SAXIFRAGACEAE.
Shrubs or trees.
Leaves opposite.
Leaves without stipules.................... 4. HYDRANGEACEAE.
Leaves with stipules; gynoecium surrounded [illegible] .... 5. CUNONIACEAE.
Leaves alternate; fruit various.
Hypanthium inflated in age................ 6. ROSACEAE.
Hypanthium produced beyond the top of the ovary; fruit a 1-celled berry........... 7. GROSSULARIACEAE.
Endosperm wanting or scant; stipules usually present.
Flowers monoecious, in dense clusters.......... 8. PLATANACEAE.
Flowers perfect or if not perfect, not in capitate clusters.
Seed with a fimbriate aril; leaves simple...... 9. CROSSOMATACEAE.
Seed without an aril.
Carpels several or numerous, or if solitary, becoming an achene.
Carpels distinct, free from the hypanthium; fruit various .... 6. ROSACEAE.
Carpels united, inclosed by and adnate to the hypanthium; fruit a pome.........10. MALACEAE.
Carpel solitary, not becoming an achene.
Carpel solitary, not becoming an achene.
Ovary 2-ovuled; fruit a drupe; leaves simple ....11. AMYGDALACEAE.
Ovary several-ovuled; fruit a legume; leaves pinnate ....12. MIMOSACEAE.

- Flowers irregular.
  - Upper petal inclosed by the lateral ones in the bud.
    - Fruit indehiscent, armed with spines; leaf blades simple .... 13. Krameriaceae.
    - Fruit a legume or loment; leaf blades compound .... 14. Caesalpiniaceae.
  - Upper petals inclosing the lateral ones in the bud .... 15. Fabaceae.

1. CRASSULACEAE. Orpine or Stonecrop Family.

Annual or perennial succulent plants with cymose or racemose, regular, mostly perfect flowers; sepals 5 usually united at the base; petals 5, distinct or united at the base; stamens of the same number or twice as many as the petals; carpels 5; follicles 1-celled, dehiscent along the ventral suture.

- Leaves opposite; stamens as many as the petals.
  - Minute annuals; carpels 1- or 2-seeded............ 1. Tillaea.
- Leaves alternate; stamens twice as many as the petals.
  - Corolla tubular, lobes long, erect................. 2. Dudleya.
  - Corolla rotate or nearly so, lobes spreading, petals united at base.
    - Leaves terete, acute.
      - Plant from a woody rootstock............... 3. Stylophyllum.
      - Plant from a corm......................... 4. Hasseanthus.
    - Leaves flat, ovate or spatulate; petals distinct... 5. Sedum.

1. TILLAEA. Pigmy-weed.

Minute glabrous annuals with opposite leaves and minute, white or pinkish, axillary flowers; sepals and petals 3-5, distinct or united at the base; carpels 3-5, 1 or 2-seeded.

1. **T. erecta** H. & A. Not uncommon on the coast sands, rarer inland. April-May.

2. DUDLEYA.

Perennial herbs with a basal rosette of flat to linear, frequently fleshy leaves, and bract-like alternate leaves on the flowering stems; flowers in panicles; calyx 5-lobed, erect; petals united at the base, yellow or reddish; stamens 10; carpels many seeded. *(Cotyledon.)*

- Flowers yellow or orange.
  - Basal leaves large, broadly spatulate; plant mealy throughout .... 1. *D. pulverulenta.*
  - Basal leaves broadly oblong; calyx 4 times as long as wide .... 2. *D. Bryceae.*

Basal leaves ovate or rhombic-ovate, acute.
Corolla twice as long as the calyx.
Leaves of the flowering branches cordate..... 3. *D. laxa.*
Leaves of the flowering branches deeply sagittate .... 4. *D. Bernardina.*
Corolla three times as long as the calyx......... 5. *D. minor.*
Basal leaves ovate, shining; leaves of the branches ovate .... 6. *D. ovatifolia.*
Basal leaves rhombic-lanceolate; corolla segments acute .... 7. *D. congesta.*
Basal leaves lanceolate to oblong-lanceolate, acuminate.
Leaves of flowering branches 3-4 cm. long...... 8. *D. robusta.*
Leaves of the flowering branches, narrowly lanceolate .... 9. *D. Parishii.*
Basal leaves long, lanceolate, acuminate, glaucous. 10. *D. delicata.*
Basal leaves long, lanceolate, acuminate, green.... 11. *D. Brauntoni.*
Basal leaves narrow, semiterete, glaucous; calyx deeply cleft .... 12. *D. aloides.*
Basal leaves strap shaped, tapering to the apex... 13. *D. grandiflora.*
Flowers reddish yellow.
Basal leaves lanceolate, acuminate; calyx segments ovate .... 14. *D. lanceolata.*
Basal leaves nearly linear; pedicels very short.... 15. *D. elongata.*
Flowers pale-green, tinged with rose; basal leaves lanceolate .... 16. *D. Hallii.*
Flowers red or reddish.
Basal leaves lanceolate, green, stem leaves reflexed .... 17. *D. reflexa.*
Basal leaves small, narrowly lanceolate, glaucous; flowers subsessile; corolla red striped... 18. *D. Abramsi.*
Basal leaves lanceolate, fleshy; pedicels long; calyx lobes ovate .... 19. *D. lurida.*
Basal leaves small, ovate; flowers pedicelled....... 20. *D. pumila.*

1. **D. pulverulenta** B. & R. The common species of the Coast Range, extending in the interior to the border of the Colorado Desert. May-June.

2. **D. Bryceae** Britt. San Diego, type locality.

3. **D. laxa** B. & R. Southern California, *N. Am. Flora.*

4. **D. Bernardina** Britt. San Bernardino Mountains, type locality. Mountains of southern California, *N. Am. Flora.*

5. **D. minor** Rose. San Gabriel Canyon, type locality. Common in the canyons of the San Gabriel Mts., from 600 to 1,000 meters. May-June.

6. **D. ovatifolia** Britt. Topango Canyon, type locality; Dunes near El Segundo. May.

7. **D. congesta** Britt. Southern California, *N. Am. Flora.*

8. **D. robusta** Britt. Southern California, *N. Am. Flora.*

9. **D. Parishii** Rose. Type locality near San Bernardino. Edison Power House, Santa Ana River. May-June.

10. **D. delicata** Rose. Southern California; Spencer Valley near Julian, type locality.

11. **D. Brauntoni** Rose. The most common species around Los Angeles and the adjoining Santa Monica mountains. The Cotyledon lanceolata of the local catalogues. May-June.

12. **D. aloides** Rose. Southern California; San Felipe, type locality, *N. Am. Flora.*

13. **D. grandiflora** Rose. Whitewater near Banning, type locality. Edison Power House, Santa Ana River. July.

14. **D. lanceolata** B. & R. Southern California; San Diego, type locality.

15. **D. elongata** Rose. San Pedro, type locality; Newport. June.

16. **D. Hallii** Rose. Near Riverside, type locality.

17. **D. reflexa** Britt. Southern California, *N. Am. Flora.*

18. **D. Abramsi** Rose. Rocks west of Jacumba, San Diego County.

19. **D. lurida** Rose. Not infrequent in the Santa Monica Hills (type locality), and in the canyons bordering the San Fernando Valley. May.

20. **D. pumila** Rose. San Bernardino Mts., type locality. Little Rock Creek. June.

3. STYLOPHYLLUM.

Perennial with woody rootstock, the rounded narrow leaves crowded at the base, the stem leaves sessile, not clasping; corolla campanulate, lobes spreading.

- Leaves flattened, especially in the lower half.
  - Corolla red.
    - Leaves viscid .... 1. *S. viscidum.*
    - Leaves green .... 2. *S. virens.*
    - Leaves glaucous; calyx-lobes obtuse............ 3. *S. albidum.*
  - Corolla bright yellow or sometimes tinged with red.
    - Calyx-lobes broadly-ovate, acute................ 4. *S. Traskae.*
    - Calyx-lobes oblong-ovate, acute................. 5. *S. semiteres.*
  - Corolla somewhat reddish.
    - Leaves broad-based, acute at apex.............. 6. *S. insulare.*
    - Leaves broad-based, obtuse at apex............ 7. *S. Hassei.*
- Leaves terete or nearly so, except at base.
  - Corolla yellow.
    - Calyx-lobes acute at apex...................... 8. *S. edule.*
    - Calyx-lobes rounded at apex.................. 9. *S. Parishii.*
  - Corolla white ....10. *S. densiflorum.*
  - Corolla rose colored...........................11. *S. Orcuttii.*

1. **S. viscidum** B. & R. Southern California; Hot Springs, San Juan Capistrano, type locality.

2. **S. virens** Rose. San Clemente Island only known locality.

3. **S. albidum** Rose. San Clemente Island only locality.

4. **S. Traskae** Rose. Santa Barbara Island, only locality.

5. **S. semiteres** Rose. Lower California or the Colorado Desert, *Rose*.

6. **S. insulare** Rose. Catalina Island, only known locality.

7. **S. Hassei** Rose. Sea Beach Catalina Island.

8. **S. edule** (Nutt.) B. & R. On rocks in the neighborhood of San Diego, the type locality.

9. **S. Parishii** Britt. Pala, type locality.

10. **S. densiflorum** Rose. Covering solidly the walls of the San Gabriel Canyon, near its mouth, this type locality. July.

11. **S. Orcuttii** Rose. Southern California and adjacent islands; Initial Monument, type locality, *Rose*.

4. HASSEANTHUS.

Low perennials with several stems arising from a round or fusiform corm; basal leaves linear, terete; those of the stems ovate; flowers in racemes; carpels 5.

Plants under 5 cm. high.	
Petals white, becoming colored; corm small, rounded	1. *H. Blochmanae.*
Petals bright yellow; calyx nearly equalling the corolla tube; root fusiform...........	2. *H. elongatus.*
Petals streaked with purple, 4 mm. long; corolla-tube much shorter than the calyx; corm small	3. *H. variegatus.*
Plants over 5 cm. high; root large fusiform.	
Petals tinged with red, 8 mm. long..............	4. *H. multicaulis.*

1. **H. Blochmanae** Rose. Point Sal, Santa Barbara Co., type locality.

2. **H. elongatus** Rose. San Joaquin Hills, Orange Co., type locality. Bluffs at Corona Del Mar. May.

3. **H. variegatus** Rose. Local near San Diego, the type locality.

4. **H. multicaulis** Rose. Ballona Bluffs, type locality. Hollywood Hills. May.

5. SEDUM. Stonecrop.

Low prostrate herbs with rosettes of leaves on horizontal stolons or low plants erect from a rhizomatus root; flowers in one-sided racemes; calyx 5-parted; petals 5, distinct or sometimes united at the very base; stamens 10; carpels united at the base.

Flowers yellow; leaves in rosettes.................. 1. *S. anomalum.*
Flowers white; leaves not in rosettes............... 2. *S. niveum.*

1. **S. anomalum** Britt. Rare and somewhat local in the San Gabriel Mts. June.

2. **S. niveum** Davidson. North slope of Sugar Loaf, San Bernardino Mts., type locality.

2. PARNASSIACEAE. Grass of Parnassus.

Glabrous perennial herbs with entire leaves in a radical tuft, the flowers solitary on a single scape-like stem; sepals 5; petals 5, white or pale yellow, conspicuously veined; stamens 5, alternating with 5 clusters of gland-bearing staminoidia; style short or none; stigmas 3-4; fruit a 1-celled capsule opening by 3 or 4 valves.

1. **P. cirrata** Piper. In wet meadows in the mountains; rare; San Bernardino Mts. Gilman Canyon, in that range, the type locality; North Fork, San Gabriel, *Miss T. Mohr.* July.

3. SAXIFRAGACEAE. Saxifrage Family.

Perennial herbs with flowering stems usually scape like; leaves mostly basal simple, entire, toothed, or lobed, the cauline when present, of slightly different shape; flowers perfect, solitary or in simple or paniculately branched cymes; hypanthium usually well developed; flowers 5-parted, rarely 4-parted; stamens as many or twice as many as the sepals; gynoceium of 2 (rarely 3 or 4) carpels; ovary partially or wholly inferior; fruit of capsules or follicles.

Placentae parietal, sometimes nearly basal.
  Flower stalk sparingly leafy, axial from a slender bulbiferous rootstock; stamens 10; carpels 3 .... 1. Lithophragma.
  Flower stalk practically leafless, from a stout, scaly rootstock; stamens 10; carpels 3....... 2. Heuchera.
Placentae axial.
  Hypanthium well developed and accrescent, at maturity longer than the sepals.
    Acaulescent, leaves basal; stamens 10; ovary free from hypanthium................ 3. Jepsonia.
    Caulescent, leaves large, stems leafy; stamens 5; ovary partially adnate to the hypanthium .... 4. Therophon.
  Hypanthium only slightly developed, unchanged at maturity; leaves all basal.............. 5. Micranthes.

17. LITHOPHRAGMA.

Slender perennials with simple stems and bulblet-bearing rootstocks; leaves mostly basal, ternately divided or rounded and lobed; hypanthium campanulate; petals white or rose colored, clawed and usually cleft; stamens 10, included; styles 3; ovary 1-celled, 3-valved at the apex. *(Tellima.)*

- Hypanthium strongly striate; adnate only to the base of the ovary.
  - Petals 6-12 mm. long, entire or only 3-lobed; hypanthium more than 3 mm. wide.
    - Basal leaves 3-parted to near the base; stems hispidulous; petals 3-lobed............... 1. *L. tripartita.*
    - Basal leaves round-lobed short-hairy; stem glandular-puberulent.
      - Petals 4-6 mm. long, lobes 3-5, acute, the blades with a broad, usually toothed base .... 2. *L. heterophylla.*
      - Petals 6-10 mm. long, with 3-5 acute lobes, the blades with a narrowly cuneate, entire base .... 3. *L. triloba.*
  - Petals entire or rarely with small lateral teeth; sepals obtuse or acutish.
    - Petals 7-8 mm. long; basal leaves rounded-crenate .... 4. *L. Bolanderi.*
    - Petals 6 mm. long or less; basal leaves more or less distinctly lobed................ 5. *L. scabrella.*
- Hypanthium turbinate or obconic, adnate to the lower half of the ovary.
  - Basal leaves not divided to near the base; petals 3-lobed or entire; hypanthium short-turbinate.
    - Basal leaves round-lobed; lobes entire or merely crenate, with very broad and rounded teeth.
      - Pedicels 5-10 mm. long, in fruit much exceeding the capsules; blades of the petals rhombic-oval, entire .... 6. *L. cymbalaria.*
      - Pedicels 2-4 mm. long, in fruit not exceeding the capsules; blades of the petals 3-cleft, or if entire, oblanceolate or spatulate.
        - Hypanthium not broader than long; stem leaves small usually with lobed divisions. 7. *L. intermedia.*
        - Hypanthium broader than long; stem leaves ample with oval crenate divisions...... 8. *L. catalinae.*
    - Basal leaves or at least some of them, 3-5-cleft; lobes often doubly crenate; petals 3-toothed.
      - Stipules broad with rounded free portion; hypanthium densely glandular, scarcely striate; sepals acute .... 9. *L. affinis.*
      - Stipules narrow with lanceolate free portion; hypanthium sparingly glandular, striate, sepals obtuse .... 10. *L. trifida.*

1. **L. tripartita** Greene. San Jacinto Mts., type locality.

2. **L. heterophylla** T. & G. Santa Barbara, type locality.

3. **L. triloba** Rydb. Central and southern California, *N. Am. Fl.*

4. **L. Bolanderi** Gray. Central and southern California, *N. Am. Fl.*

5. **L. scabrella** Greene. Pine woods south of Tehachapi, type locality; Deep Creek, *Parish.*

6. **L. cymbalaria** T. &. G. Southern California near the coast; Santa Barbara the type locality.

7. **L. intermedia** Rydb. Shady slopes of the Santa Monica Range, and south to San Diego. Los Angeles Co., type locality. April-June.

8. **L. catalinae** Rydb. Santa Catalina Island. June.

9. **L. affinis** Gray. Throughout southern California. June.

10. **L. trifida** Eastwood. Sweetwater Dam, San Diego; type and only known locality.

2. HEUCHERA. Alum Root.

Tufted perennials; leaves mostly basal, long petioled, roundish or cordate lobed; flowering stems scapiform, bearing a few alternate reduced leaves and a narrow panicle of purplish or greenish white flowers; hypanthium campanulate or turbinate; petals small, entire; stamens 5; styles 2; capsule 1-celled.

Stamens scarcely exserted.
  Leaves and petioles glabrous; hypanthium dark red .... 1. *H. Abramsii.*
  Leaves ciliate on the margins; petioles sparingly hirsute; hypanthium purplish.......... 2. *H. elegans.*
  Leaves densely white-hairy on both sides; petioles densely hirsute; hypanthium greenish-brown .... 3. *H. hirsuta.*
Stamens exserted.
  Leaves ciliate on the margin, slightly hispid on both sides, petioles white-hirsute........... 4. *H. Parishii.*

1. **H. Abramsii** Rydb. Common among the rocks on the summit of Mt. San Antonio, (type locality). Mt. San Gorgonio; *Grinnel.* July-Aug.

2. **H. elegans** Abrams. Common through the pine belt of the San Gabriel and San Antonio Ranges; Mt. Wilson type locality. July.

3. **H. hirsuta** Rydb. Snow Canyon, San Bernardino at 1,800 m.; type locality.

4. **H. Parishii** Rydb. Mill Creek, San Bernardino; type locality.

3. JEPSONIA.

Perennial acaulescent herbs, flowering in the autumn the leaves appearing with the first rains; flowers 5-parted, in terminal cymes; corolla white purple-veined; carpels 2, united to about the middle.

Leaves broader than long; calyx lobes shorter than the tube .... 1. *J. Parryi.*

Leaves longer than broad; calyx lobes as long or longer than the tube.................. 2. *J. malvifolia.*

1. **J. Parryi** Small. Dry hills near San Diego, type locality; San Antonio Mts., *Munz.*

2. **J. malvifolia** Small. Santa Rosa; Santa Cruz; Catalina Islands.

4. THEROPHON.

Perennial glandular-pubescent herbs, with erect leafy stems, with paniculate cymes of small white flowers; leaves round-reniform, palmately lobed or toothed, the teeth with callous-glandular tips; flowers 5-parted; hypanthium adnate to the lower half of the ovary; capsule 2-celled. *(Boykinia.)*

Leaves cleft, teeth acute; petioles glabrous or nearly so; petals 5 mm. long.................. 1. *T. occidentale.*

Leaves rounded, teeth mucronate; petioles densely glandular-villous; petals 3 mm. long..... 2. *T. rotundifolium.*

1. **T occidentale** Rydb. Rocky margins of the streams of the Coast Range from Santa Barbara to Topango Canyon, Los Angeles. June.

2. **T. rotundifolium** Wheelock. Common on the beds of streams below 900 m. alt.; San Bernardino Co. type locality.

5. MICRANTHES.

Perennial acaulescent plant, with dentate basal leaves; flowers small white, in branched cymes on a solitary glandular-pubescent scape; hypanthium flat, shorter than the calyx; follicles with divergent beaks. (*Saxifraga* in part.)

1. **M. californica** Small. In shady nooks in the canyons of the Santa Monica, Ventura, and San Bernardino Mts.; not common, and much smaller than the northern forms; our plants usually not more than 15 cm. tall. March.

4. HYDRANGEACEAE. Hydrangea Family.

Shrubs with opposite and entire, or toothed ovate or oblong leaves, more or less petioled, deciduous and without stipules; flowers large and showy, solitary or cymose; flower 4-10-parted; stamens numerous; filaments linear or flattened, sometimes appendaged; ovary adnate to the hypanthium to its summit; carpels 2-10; fruit a capsule.

1. PHILADELPHUS. Mock Orange.

Branching shrub, ours with leaves 6-10 mm. long, silky pubescent beneath, very short petioled; flower large, mostly solitary, white, fragrant; stamens 30; style united; ovary 4-celled.

1. **P. pumilus** Rydb. Very common among the rocks in the Upper Transition Zone from Lake Surprise to the head of Round Valley, Mt. San Jacinto. Tamarack Valley, San Jacinto type locality, *Hall.*

5. CUNONIACEAE.

Shrubs or trees with opposite simple or compound leaves; flowers small 4-5-parted; stamens 4-15 inserted below the perigynous disc within the hypanthium; carpels 2; fruit a capsule or follicle; seeds in 2 rows.

1. LYONOTHAMNUS.

Trees or shrubs with persistent petioled leaves, varying from simple lanceolate, entire or serrulate to compound leaves with aspleniform segments; flowers in terminal compound cymes; hypanthium campanulate, 1-3-bracted; petals 5 orbicular, white; pistils 2; follicle 4-seeded.

1. **L. floribundus** Gray. Confined to the Islands of Catalina, Santa Cruz, and San Clemente. Very variable in size; on Catalina it attains a height of 15 m. and a diameter of 6 dm. June-August.

6. ROSACEAE. Rose Family.

Herbs or shrubs with alternate, simple, pinnate or compound leaves and mostly foliaceous stipules; flowers perfect; hypanthium variable, often margined with a ringed disk that bears the stamens; sepals 5 (rarely 4) subtended by an equal number of bractlets; petals 5 or none; stamens and pistils 1-many; fruit of achenes, follicles or bristles.

Herbs annual; petals none; leaves palmately cleft... 1. Aphanes.
Herbs, perennial.
Sepals subtended by an equal number of bractlets.
Style articulated to the ovary, deciduous.
Styles terminal.
Stamens separated from the receptacle by an open space.
Filaments petaloid; stamens 10; pistils 3 or more .... 2. Horkelia.
Filaments filiform, (petaloid in *I. argyrocoma*).
Stamens 20; pistils 3 or more......... 3. Ivesia.
Stamens 15; pistils 1.................... 4. Stellariopsis.
Stamens inserted on a thickened ring close to the receptacle .... 5. Potentilla.
Styles lateral.
Receptacle not enlarged; leaves pinnate; flowers yellow .... 6. Argentina.
Receptacle forming a "berry"; leaves trifoliate, flowers white .... 7 Fragaria.
Styles nearly basal; leaves pinnate............ 8. Drymocallis.
Styles not articulated to the ovary, lower part persistent, forming a hook............... 9. Geum.
Sepals not subtended by bractlets.
Petals absent; calyx petaloid; fruit not prickly....10. Poteridium.
Petals present; fruit bur-like with hooked prickles. 11. Agrimonia.
Shrubs.
Petals wanting.
Sepals 4; leaves opposite; spinescent shrub......14. Coleogyne.
Sepals 5; leaves alternate; fruit a plumose tailed achene ....19. Cercocarpus.
Petals present.
Fruit enclosed in a berry-like hypanthium, a "hip" ....22. Rosa.
Fruit of fleshy coherent drupelets, commonly called a "berry."
Receptacle conical; stems prickly.............21. Rubus.
Receptacle flat; stems not prickly...........20. Rubacer.
Fruit of 1 or many dry achenes.
Styles elongated and plumose in fruit.
Flowers showy.
Flowers corymbose; hypanthium with bractlets ....15. Fallugia.
Flowers solitary; hypanthium without bractlets ....16. Cowania.
Styles not elongated or plumose in fruit.
Flowers solitary, yellow; leaves 3-cleft......17. Purshia.
Flowers paniculate, white.
Leaves toothed above the middle; carpels 5 ....12. Sericotheca.
Leaves filiform or clavate; carpel 1.......13. Adenostoma.
Leaves thrice pinnatifid; pistil 1.........18. Chamaebatia.

1. APHANES. Lady's Mantle.

Ours, very small annuals with leafy stems and minute green flowers fascicled in the axils of the palmately lobed and toothed, subsessile leaves; hypanthium urceolate; sepals 4 or 5; petals none; stamens and pistils 1 or 2. *(Alchemilla.)*

1. **A. cuneifolia** Nutt. Borders of thickets and dry plains, Santa Monica Mts.; Santa Barbara. May.

2. HORKELIA.

Perennial herb with scaly rootstocks, pinnate leaves and cymose flowers; hypanthium campanulate to saucer shaped; bractlets, sepals and petals 5; petals white or yellow; stamens 10 separated from the receptacle by an open space, filaments dilated, petaloid; pistils 3-15; style articulated and deciduous; fruit of achenes.

Leaflets deeply incised............................ 1. *H. Wilderae.*
Leaflets toothed.
Pubescence silky; plants densely canescent........ 2. *H. Rydbergii.*
Pubescence short.
Plant stout, leaflets 10-25 mm. long............ 3. *H. Kelloggii.*
Plant slender, leaflets 5-10 mm. long.......... 4. *H. Clevelandi.*
Pubescence hoary .... 5. *H. bernardina.*
Plant hirsute and glandular.
Hypanthium saucer shaped.
Leaflets acute, regularly and coarsely toothed. 6. *H. platycalyx.*
Leaflets truncate, 3-toothed at the apex.... 7. *H. truncata*
Hypanthium cupulate .... 8. *H. puberula.*

1. **H. Wilderae** Parish. On trail from Barton Flats to Santa Ana River, the type locality. July.

2. **H. Rydbergii** Elmer. Dry flats near Griffin's Postoffice, Ventura Co., the type and only known locality.

3. **H. Kelloggii** Greene. Port Ballona, *Abrams.* From Los Angeles to Santa Barbara, *Bot. Cal.* May.

4. **H. Clevelandi** Rydb. Rather common in Transition Zone, Mt. San Jacinto, *Hall.* Laguna in the San Diego mountains, the type locality.

5. **H. bernardina** Rydb. In moist meadows, north slope of the San Gabriel Mts., and throughout the San Bernardino Mts., the type locality. June-July.

6. **H. platycalyx** Rydb. Interior plains of Los Angeles and Orange Co's.; Santa Barbara, type locality. April.

7. **H. truncata** Rydb. Southern California; Ramona, type locality, *N. Am. Flora.*

8. **H. puberula** Rydb. Frequent in sandy soils, from San Fernando and Glendale to Orange Co. Mesas west of San Bernardino, the type locality. April-May.

3. IVESIA.

Herbaceous perennials of the higher mountains, with woody caudices and pinnately divided leaves, the leaflets crowded or closely imbricated; filaments filiform except in *L. argyrocoma,* in which they are slightly dilated; pistils surrounded by a ring of bristles; the characters otherwise as in *Horkelia.*

Plant over 1 dm. high; leaves silvery white......... 1. *I. argyrocoma.*
Plant over 5 cm. high; leaves villous............... 2. *I. callida.*

1. **I. argyrocoma** Rydb. Dry valleys at Strawberry Valley, San Jacinto Mts.; Bear Valley, San Bernardino Mts. June-July.

2. **I. callida** Rydb. Rock fissures on Mt. Tahquits, San Jacinto; the only known locality.

4. STELLARIOPSIS.

Perennial herbs with the general characters of *Ivesia,* but with stamens 15, and purplish, didymous and obcordate anthers; pistil single.

1. **S. santolinoides** Rydb. Sandy meadows Bear Valley, San Bernardino Mts. July.

5. POTENTILLA. Five-finger.

Annual, biennial or perennial herbs, with pinnately or palmately compound leaves, the leaflets usually toothed or cleft; flowers yellow, mostly in terminal cymes; hypanthium hemispheric; bractlets, sepals and petals 5; stamens 10 or 20; pistils many; fruit of small achenes.

Annual or biennial, very leafy.
  Leaves ternate, very thin, leaflets deeply serrate, sepals 4 mm. long; petals 2 mm. long; stamens 10 .... 1. *P. millegrana.*
Perennial.
  Leaves digitate.
    Plant erect or semidecumbent, over 2 dm. high.
      Leaflets cut nearly half way to midrib.
        Leaflets green, pubescent on both sides; bracts one-half the length of the sepals; sepals and petals equal............... 2. *P. Parishii.*
        Leaflets slightly hairy above, paler and hirsute beneath; bractlets linear-lanceolate, one-third the length of the sepals; sepals and petals equal...................... 3. *P. Hallii.*

Leaflets green above, lighter beneath, densely hirsute on both sides, teeth few; bractlets oblong-lanceolate, nearly equalling the sepals; petals slightly longer than sepals .... 4. *P. lasia.*

Plants low decumbent.

Leaflets cut more than half way to midrib.

Leaflets appressed silky above, densely silky beneath; bractlets one-half the length of the sepals; sepals and petals equal...... 5. *P. Elmeri.*

Leaflets loose hairy on both sides, almost white beneath; bractlets one-half the length of the sepals and petals......... 6. *P. comosa.*

Plants low, spreading; less than 2 dm. high.

Leaflets silky on both sides, crenate at summit; sepals inflexed in fruit............ 7. *Wheeleri.*

Leaflets green, short pubescent above, densely silky beneath; bractlets one-half the length of the petals and sepals......... 8. *P. Hassei.*

Leaves pinnate; flowers few; petals 2-3 mm. long.

Plants glandular viscid.

Leaflets 7-15, cleft to the middle; bractlets equalling the petals; plant 3 dm. high.. 9. *P. saxosa.*

Leaflets 5, crenate, thick; braclets ovate, one-half as long as the sepals; plant 1 dm. high ....10. *P. rosulata.*

Leaflets 3-5, thin; bractlets linear-lanceolate, one-half as long as the sepals; plant 1 dm. high ....11. *P. acuminata.*

Plants not glandular-viscid, plant tall; flowers large.

Leaflets 13-25, strigose, deeply toothed; bractlets oblong 4 mm. long; sepals 6 mm.; petals 8 mm. long...................12. *P. multijuga.*

1. **P. millegrana** Engl. Bear Valley, San Bernardino Mts.; Tehachapi. June-July.

2. **P. Parishii** Rydb. Meadows of southern California; Descanso, San Diego Co.; type locality.

3. **P. Halli** Rydb. San Bernardino Mts.

4. **P. lasia** Rydb. Meadows and cienegas on the north slope of the San Gabriel Mts.; Tehachapi and San Bernardino Mts., the type locality. June-July.

5. **P. Elmeri** Rydb. Ventura County, the type locality.

6. **P. comosa** Rydb. Bear Valley, San Bernardino Mts., type locality.

7. **P. Wheeleri** Wats. Bear Valley, San Bernardino; Mt. San Antonio. June.

8. **P. Hassei** Rydb. Strawberry Valley, San Diego Co., type locality.

9. **P. saxosa** Lemmon. Southern California, *N. Am. Flora.*

10. **P. rosulata** Rydb. Twenty-nine Palms, Colorado Desert; type locality.

11. **P. acuminata** Hall. In rock crevices Chino Creek, San Jacinto; type locality; White mountains.

12. **P. multijuga** Lehm. Cienega near Ballona the type and only known locality. May.

6. ARGENTINA. Silver-weed.

Prostrate herbs with numerous slender runners, the interruptedly pinnate leaves white and silky pubescent beneath; flowers yellow, 5-parted; stamens 20-25 in 3 series; achenes with a thick pericarp. (*Potentilla* in part.)

1. **A. anserina** Rydb. In sandy soils along streams and margins of ponds, both on coast and mountains. May-July.

7. FRAGARIA. Strawberry.

Small herbaceous perennial with scaly rootstocks producing runners which form new plants; leaves trifoliate; flowers as in *Potentilla,* but the achenes borne on the enlarged, berry-like receptacle; petals white.

1. **F. californica** C. & S. Occasional along stream banks in the lower pine belt in the San Bernardino and San Jacinto Mts. June-July.

8. DRYMOCALLIS.

Perennial herbs with glandular foliage and pinnate leaves, differing from *Potentilla* in having the stamens in 5 festoons around the receptacle, the style nearly basal, and the seeds ascending and orthotropous.

Petals white .... 1. *D. lactea.*
Petals yellow.
  Petals much exceeding sepals.
    Styles fusiform, less than twice the length of the ovary .... 2. *D. monticola.*
  Petals equalling the sepals, or nearly so.
    Styles filiform, more than twice the length of the ovaries .... 3. *D. cuniefolia.*
    Styles fusiform.
Bractlets two-thirds as long as the sepals........... 4. *D. glandulosa.*
Bractlets one-half as long as the sepals........... 5. *D. Hanseni.*
  Petals reflexed.
    Calyx and hypanthium 10-12 mm. long in fruit; plant stout .... 6. *D. Wrangelliana.*
    Calyx and hypanthium 6-10 mm. long in fruit; plant slender .... 7. *D. viscida.*

1. **D. lactea** Rydb. Plentiful in Tahquitz and Round Valley, San Jacinto Mts., at 2,700 m., *Hall;* Prairie Fork, San Gabriel River at 2,100 m., *Johnston.* July.

2. **D. monticola** Rydb. Common in cienegas in the Lower Transition Zones of all our interior mountains. July.

3. **D. cuniefolia** Rydb. Green Lead, San Bernardino Mts.; only known locality.

4. **D. glandulosa** Rydb. Frequent in the chaparral belt of our coast hills. April-May.

5. **D. Hanseni** Rydb. A not uncommon species in the Middle Sierras, and reported from the San Bernardino Mts., *Rydberg.*

6. **D. Wrangelliana** Rydb. Occasional in canyons in the lower chaparral zone in the San Bernardino and Tehachapi Mts. July.

7. **D. viscida** Parish. Snow Canyon (type locality), and Vivian Creek, in the Hudsonian Zone, San Bernardino Mts., *Parish;* Mt. San Jacinto. July-August.

9. GEUM. Avens.

Perennial herbs with large leaves, mostly radical, lyrate or pinnate, stipules adnate to the sheathing petioles; flowers large cymose, yellow; bractlets, sepals and petals 5; stamens and pistils many, fruit an achene with hooked bristles.

1. **G. macrophyllum** Willd. Occasional in meadows in the Transition Zone of the San Bernardino Mts.; stream banks, Sevenoaks. July.

10. POTERIDIUM. Burnet.

A biennial or perennial herb with pinnate leaves, coarsely toothed petiolulate leaflets and foliaceous adnate stipules; flowers small, bracteate in a dense spike on a long, naked peduncle; calyx 3-4-angled and thickish, petal-like; petals none; stamens 4-12, filaments often elongated; carpels 1-3.

1. **P. occidentale** Rydb. Cuyamaca Mts.

11. AGRIMONIA. Agrimony.

Stout perennials with odd-pinnate leaves and long slender terminal racemes of small yellow flowers; hypanthium bearing bristles, the lower ones reflexed; sepals and petals 5; stamens 5-15 in 1 row; pistils 2; achenes 1 or 2, enclosed in the bur-like hypanthium.

1. **A. gryposepala** Wallr. Local in Potato Canyon; San Bernardino Mts., *Parish.* July.

12. SERICOTHECA.

Deciduous shrubs with simple toothed exstipulate leaves and terminal panicles or creamy white flowers; stamens 20 inserted on an annular disk; pistils 5, becoming 1-seeded hairy achenes. (*Spirea in part.*)

Flowers large, racemes compound.
  Leaves over 3 cm. long, distinctly petioled, not decurrent .... 1. *S. franciscana.*
Flowers simple or only short branched.
  Leaves contracted into short winged petioles....... 2. *S. saxicola.*
  Leaves sessile, cuneate at base................... 3. *S. concolor.*

1. **S. franciscana** Rydb. (Spirea discolor B. & W.) In the coast range from Santa Barbara to the Santa Monica Mts., where it is seemingly rare. May.

2. **S. saxicola** Rydb. Bear Valley.

3. **S. concolor** Rydb. Summits of Mt. San Antonio; Mt. Pinos; Mts. San Gorgonio and San Jacinto; Green Valley, San Bernardino Mts. July.

13. ADENOSTOMA. CHAMISO.

Evergreen heath-like shrubs with rigid, filiform or clavate, fascicled, stipulate leaves and small white flowers in closely panicled racemes; hypanthium obconic, 5-toothed 10-angled, bearing 5 glands in the throat; petals 5, orbicular; stamens 10-15 inserted in groups opposite each sepal; pistil 1, style lateral.

Leaves clavate, fascicled; stamens 15.
  Leaves acute, petioled, glabrous.................. 1. *A. fasciculatum.*
  Leaves obtuse, sessile, pubescent................. 2. *A. brevifolium.*
Leaves filiform, light-green; stamens 10........... 3. *A. sparsifolium.*

1. **A. fasciculatum** H. & A. This heath like shrub is the most characteristic feature of the Coast Ranges, forming the Chaparral Belt in the Zone system. May.

2. **A. brevifolium** Nutt. Neighborhood of San Diego, type locality. May.

3. **A. sparsifolium** Torr. Abundant in the mountains east of San Diego; San Jacinto and San Bernardino Mts.; Topango Canyon; Warner's Pass, type locality.

14. COLEOGYNE. BLACK BUSH.

A diffusely branched somewhat spinescent shrub with opposite small, entire coriaceous leaves; stipules minute; flowers solitary terminal, on short branchlets, subtended by 1 or 2 pairs of

3-lobed bracts, yellow and showy; sepals 4; petals none; stamens 30-40; pistil 1, style lateral; fruit an achene.

1. **C. ramosissima** Torr. Mohave Desert; Haiwee and eastwards; Iron Wood Springs, Colorado Desert, *Brandegee.*

15. FALLUGIA. Apache Plume.

A low evergreen shrub with small, fascicled, pinnately divided, hispidulous leaves; flowers white, showy, usually solitary on long, naked peduncles; sepals and petals 5; stamens many; fruit an achene with a long plumose tail.

1. **F. paradoxa** Endl. Providence Mts., *Abrams.*

16. COWANIA. Cliff Rose.

A much branched shrub with toothed or pinnatifid, glandular-dotted leaves, revolute margined and tomentose beneath; flowers showy, solitary, terminal; sepals 5; petals 5, light yellow; stamens numerous; achenes 5, villous with a long plumose tail.

1. **C. Stansburiana** Torr. Providence Mts., *Brandegee.*

17. PURSHIA.

A much branched Juniper-like shrub with alternate, deeply 3-cleft, crowded leaves with revolute, glandular-punctate margins; flowers solitary, terminal; sepals 5; petals 5, yellow; pistil 1; achene attenuate, exserted.

1. **P. glandulosa** Curran. Very common on the mountain slopes bordering the Mohave Desert, from Harold to the Cajon Pass; San Bernardino and Tehachapi Mts. (type locality), April.

18. CHAMAEBATIA. Mountain Misery. Tar-bush. Bear-clover.

An erect, malodorous shrub with glandular-pubescent foliage; leaves twice or thrice pinnate with numerous minute leaflets; flowers rather large, in terminal cymes; hypanthium turbinate; sepals 5; petals 5, white; pistil 1, becoming a coriaceous obovoid achene.

1. **C. australis** Abrams. Mt. Miguel, San Diego Co., and southwards. June.

19. CERCOCARPUS. Mountain Mahogany.

Shrubs or small trees with hard, dark-colored wood; leaves alternate, simple; flowers small, axillary or terminal; solitary or fascicled; hypanthium with a cylindric persistent tube; sepals

5; corolla wanting; stamens numerous; pistil 1; fruit a villous achene terminating in a long twisted plumose tail.

Leaves rigid, margins entire, revolute.............. 1. *C. ledifolius.*

Leaves toothed in the upper half.
- Leaves coriaceous, densely white tomentose beneath 2. *C. Traskiae.*
- Leaves not coriaceous.
  - Hypanthium and young leaves villous.
    - Leaves 2-4 cm. long, obovate or oblanceolate; a small tree .... 3. *C. Douglasii.*
    - Leaves 1-3 cm. long, orbicular or broadly ovate 4. *C. rotundifolius.*
    - Leaves 4-5 cm. long, oval, thin; a small tree... 5. *C. alnifolius.*
  - Hypanthium and young leaves silky-strigose, leaves 2-5 cm. long.................. 6. *C. betuloides.*
  - Hypanthium nearly glabrous; leaves 1-2 cm. long. 7. *C. minutiflorus.*

1. **C. ledifolius** Nutt. Scattered throughout the Upper Sonoran and Lower Transition Zones on all the interior mountains. June-July.

2. **C. Traskiae** Eastw. Salt Valley, Catalina Island; only locality. March.

3. **C. Douglasii** Rydb. A common chaparral shrub of the Coast Ranges from Santa Barbara to Orange Co.; San Bernardino Mts. March-April.

4. **C. rotundifolius** Rydb. This is the common species in the Santa Monica Mts., San Antonio Canyon. March-April.

5. **C. alnifolius** Rydb. Canyons west of Avalon, Catalina Island; only locality. April.

6. **C. betuloides** Nutt. In the Coast Range from Ventura to Santa Barbara. April.

7. **C. minutiflorus** Abrams. On chaparral covered hills in the Upper and Lower Sonoran Zones, Escondido to Lower California; foothills of San Jacinto Mt., *Hall;* San Dieguito, type locality.

20. RUBACER. THIMBLE-BERRY.

A low unarmed shrub, glandular-hispid above, with 3-5-lobed leaves with cordate base; sepals 5. long-acuminate, white-tomentose within; petals white, about 20 mm. long; fruit large convex, red.

1. **R. tomentosum** Rydb. (Rubus nutkanus velutinus.) Frequent in the Lower Transition Zone of the San Bernardino and San Jacinto Mts.; St. Ynez Mts., *Abrams;* Mt. Palomar, *Stokes*

21. RUBUS. Blackberry.

Erect or trailing prickly shrubs, ours with 3-5-foliolate leaves with adnate stipules; flowers in panicles; sepals 5; petals 5, white; stamens numerous; pistils numerous ripening into a coherent body of small drupelets forming the aggregate fruit called a blackberry.

Fruit parting freely from the receptacle; prickles stout recurved; leaves white-tomentose beneath .... 1. *R. bernardinus.*
Fruit persisting on the receptacle; prickles weak, straight; leaves green on both sides.... 2. *R. vitifolius.*

1. **R. bernardinus** Rydb. Mill Creek Falls, San Bernardino Mts., type locality; Mt. Wilson. June.

2. **R. vitifolius** C. & S. Frequent in the valleys, mostly along streams. February-April.

22. ROSA. Rose.

Prickly shrubs with alternate pinnate leaves, adnate stipules and solitary or corymbose flowers; hypanthium contracted at the mouth, becoming fleshy in fruit; sepals 5 with more or less foliaceous tips; petals 5, pink; stamens many; fruit of bony achenes enclosed in the enlarged red berry-like hypanthium.

Prickles recurved.
  Leaflets more or less glandular-puberulent.
    Hypanthium with a distinct neck.
      Teeth of leaflets double and gland-tipped.
        Sepals glabrous .... 1. *R. Aldersonii.*
        Sepals glandular-hispid on back............ 2. *R. Greenei.*
      Teeth of leaflets usually simple, not gland tipped .... 3. *R. californica.*
    Hypanthium without a neck.
      Leaflets simple or double toothed............ 4. *R. brachycarpa.*
Prickles straight.
  Leaflets more or less pubescent but not glandular.
    Leaflets simply serrate, pubescent beneath; hypanthium pilose when young........... 5. *R. Sanctae-Crucis.*
    Leaflets villous beneath; sepals tomentose on both sides .... 6. *R. Johnstonii.*
  Leaflets glabrous, (sometimes lightly puberulent in *R. gratissima.*)
    Leaflets elliptical, shiny...................... 7. *R. mohavensis.*
    Leaflets narrow-ovate; young stems, dark brown and densely prickly.................. 8. *R. gratissima.*

1. **R. Aldersonii** Greene. In the coast ranges from Redondo to San Diego; Witch Creek, San Diego, type locality. May-August.

2. **R. Greenei** Rydb. Island of Santa Cruz, type locality.

3. **R. californica** C. & S. The common rose of the foothills and interior valleys. June-July.

4. **R. brachycarpa** Rydb. Southern California, *Rydberg;* Temescal Canyon, Elsinore, type locality.

5. **R. Sanctae-Crucis** Rydb. Island of Santa Cruz.

6. **R. Johnstonii** Rydb. Type, and only locality near Upland, San Bernardino Co. July.

7. **R. mohavensis** Parish. Southern border of the Mohave Desert; Cushenberry Springs, type locality. July.

8. **R. gratissima** Greene. Rock Creek and adjacent mountains. July.

15. FABACEAE. Bean Family.

Herbs, shrubs or trees with alternate compound or rarely simple leaves; flowers papilionaceous; calyx of 5 more or less united sepals; petals 5, irregular, the upper petal (banner) larger and enfolding the others in the bud, the two lowest uniting to form the keel, the two lateral forming the wings; stamens mostly 10, monadelphous, diadelphous or distinct; fruit a legume, 1-celled (2-celled in some *Astragali*) containing 1-many seeds. *(Leguminosae.)*

Stamens distinct.
Leaves digitately 3-foliolate.
Flowers yellow; herbs with conspicuous stipules.. 1. Thermopsis.
Flowers purple, solitary; shrub with minute stipules or none...................... 2. Xylothermia.
Stamens monadelphous or diadelphous (9 and 1).
Foliage not glandular-dotted.
Leaves [illegible] .... 3. Lupinus.
Leaves 3-foliolate.
Herbs; leaves more or less toothed.
Flowers in racemes.
Pods curved or coiled.................... 4. Medicago.
Pods straight .... 5. Melilotus.
Flowers in heads....................... 6. Trifolium.
Shrubs.
Leaves foliaceous, entire.................. 7. Cytisus.
Leaves spiny .... 8. Ulex.
Leaves equally pinnate terminated by a tendril.
Styles hairy all round and below the apex.... 9. Vicia.
Styles hairy on one side.....................10. Lathyrus.
Leaves unequally pinnate.
Herbs or suffrutescent perennials.
Flowers in spikes or racemes.
Keel prolonged into a beak.............11. Oxytropis.
Keel not prolonged into a beak..........12. Astragalus.

Flowers solitary or in umbels.
  Pods dehiscent ....13. HOSACKIA.
  Pods indehiscent ....14. SYRMATIUM.
Trees, spinescent; flowers in racemes.
  Flowers white, numerous; pod 4-7-seeded...15. ROBINIA.
  Flowers purplish, 3 or 4; pod 1-2-seeded....16. OLNEYA.
Foliage glandular-dotted.
  Pods covered with hooked prickles............17. GLYCYRRHIZA.
  Pods not prickly.
    Pods 1-seeded.
      Leaves pinnately 3-foliolate; pod indehiscent.18. HOITA.
      Leaves digitately 3-5-foliolate; pod irregularly dehiscent ....19. PEDIOMELUM.
    Pods 2-6-seeded.
      Petals 1 (the banner)....................20. AMORPHA.
      Petals 5, not adnate to the staminal tube.
        Pod exserted; flowers pedicelled..........21. PSORODENDRON.
        Pod not exserted; flowers sessile..........22. PSOROTHAMNUS.
      Petals 5, adnate to the staminal tube.
        Stamens 10 or 9........................23. PAROSELA.

1. THERMOPSIS. FALSE LUPINE.

Coarse perennial herbs with digitately 3-foliolate leaves, foliaceous stipules and large yellow flowers in terminal racemes; calyx cleft to the middle, the teeth equal or the two upper united; stamens distinct; pods linear, flat.

1. **T. californica** Wats. Southern border of the Antelope Valley; San Diego Mts., *Orcutt.* May-June.

2. XYLOTHERMIA. CHAPARRAL PEA.

An irregular spinose shrub with small, nearly sessile, evergreen, digitately 3-foliolate leaves without stipules and large, solitary, subsessile, purple flowers; calyx 4-toothed; stamens distinct; pods linear, compressed, stipitate, straight. *(Pickeringia.)*

1. **X. montana** Greene. Channel Islands; Santa Ynez Mts., *Abrams.*

Var. *tomentosa* Abrams. Twigs and leaves canescent, not green and merely puberulent as in the type. Occasional in the chaparral from San Bernardino to San Diego.

3. LUPINUS. LUPINE.

Herbaceous annuals or perennials, some of the latter shrubby; leaves palmately 5-15-foliolate, the leaflets entire and sessile; stipules adnate to the petiole, and flowers in whorls or scattered in terminal racemes with the bracts sometimes persistent; calyx bilabiate, the lips entire or variously cleft; banner roundish, wings commonly united at the tip in front of and enclosing the falcate keel; keel naked or more or less ciliate; stamens monadelphous, alternately oblong and rounded; pods 2-valved, compressed, 2-12 seeded.

- Annual.
  - Flowers verticillate.
    - Bracts persistent.
      - Flowers red; upper lip obsolete, lower bifid with a cusp in the sinus; calyx ebracteolate .... 1. *L. microcarpus.*
      - Flowers violet-blue; upper lip 2 mm. long, deeply cleft, lower 6 mm. long, 2-toothed; calyx bracteate .... 2. *L. horizontalis.*
      - Flowers white or yellowish-white (occasionally pinkish); upper lip scarious, open-cleft.. 3. *L. densiflorus.*
    - Bracts early deciduous; upper calyx lip open cleft, lower lip entire or trifid.
      - Flowers 3-6 mm. long; keel ciliate near tip.
        - Herbage pilose-pubescent: stems slender..... 4. *L. micranthus.*
        - Herbage pubescent; stems stouter; banner not reflexed .... 5. *L. polycarpus.*
      - Flowers 10-12 mm. long.
        - Herbage pubescent; keel ciliate near tip.... 6. *L. nanus.*
        - Herbage glabrous; keel ciliate below and in the fork .... 7. *L. affinis.*
  - Flowers scattered, sometimes subverticillate.
    - Foliage glabrous or nearly so; bracts subpersistent.
      - Pod linear, several seeded; flowers scattered.
        - Banner deep purple; leaves linear, truncate or toothed at the apex................ 8. *L. truncatus.*
        - Banner yellow, wings rose-red; leaves obovate .... 9. *L. Stiveri.*
      - Pod quadrate, villous on the margins, 4-seeded; flowers deep purple, subverticillate, keel naked ....10. *L. odoratus.*
    - Foliage densely villous or pilose.
      - Hairs on foliage nodose.
        - Keel ciliate at the fork; bracts deciduous; raceme elongated; pod linear; plant erect.11. *L. sparsiflorus.*
        - Keel naked; bracts persistent; racemes short; pods short.
          - Plant hirsute, low; pod 4-seeded........12. *L. concinnus.*
          - Plant diffuse; pod linear 5-6-seeded....13. *L. Agardianus.*
      - Hairs not nodose.
        - Foliage densely villous.
          - Pods ovate, 2-seeded; flowers blue or pale tinted.
            - Upper lip of calyx 2 mm. long, bifid,, less than half the length of the lower; flowers crowded...........14. *L. brevicaulis.*
            - Upper calyx lip nearly equaling the lower; flowers scattered; pod ciliate margins ....15. *L. Shockleyi.*

Pods linear, 5 or more seeded.

Foliage subhirsute; flowers subverticillate .... 16. *L. subhirsutus.*

Foliage densely hispid; racemes loose.... 17. *L. hirsutissmus.*

Perennial.

Herbaceous.

Herbage glabrous; keel ciliate in lower half..... 18. *L. cytisoides.*

Herbage silky-pubescent.

Bracts deciduous.

Keel naked.

Sepal gibbous; leaves narrow, silvery-silky. 19. *L. inyoensis.*

Keel ciliate; leaves puberulent and silky-villous .... 20. *L. Sitgreavesii.*

Bracts persistent; racemes dense; flowers 8-10 mm. long .... 21. *L. confertus.*

Herbage pubescent or hirsute, not silky; keel naked.

Stems leafy throughout.

Leaflets 2 cm. long, cuneate-oblong, very obtuse; flowers deep purple.............. 22. *L. clementinus.*

Leaflets 5 cm. long, oblong, linear, very acute; flowers purple................. 23. *L. hyacinthus.*

Stems not leafy throughout; leaflets lanceolate, acute; flowers large, purple........... 24. *L. formosus.*

Suffrutescent.

Herbage densely silky pubescent.

Flowers 6-8 mm. long; keel ciliate in middle third; dwarf mountain species......... 25. *L. Breweri.*

Flowers more than 10 mm. long; banner with permanent yellow spot.

Keel naked; stems leafy; sand dune species. 26. *L. Chamissonis.*

Keel ciliate; stems from a woody caudex; mountain species .... 27. *L. Grayi.*

Shrubby tall plants; upper calyx lip cleft, lower entire.

Keel ciliate above the middle to near the tip.

Flowering in spring only.

Leaves silky-pubescent; stems trunk-like at base .... 28. *L. Paynei.*

Leaves softly villous on both sides; stems fistulous .... 29. *L. molissifolius.*

Flowering through summer and autumn.

Leaves pubescent and somewhat silky; foothill species .... 30. *L. Hallii.*

Leaves adpressed pubescent.

Seeds dark gray, mottled with dark brown; seaside species .... 31. *L. longifolius.*

Seeds light tan, mottled with dark tan.... 32. *L. Brittoni.*

Keel ciliate on apical third and slightly at base; sepals large, subequal entire, leaves pubescent .... 33. *L. arboreus.*

1. **L. microcarpus** ruber Smith. Jucumba Hot Springs; Argus Mts., *Smith.*

2. **L. horizontalis** Heller. Sunset, Kern Co., type locality.

3. **L. densiflorus** Benth. A very variable species, tall, upright and spreading or short with crowded branches, herbage short adpressed pubescent, loosely or densely villous or almost woolly. *C. Piper Smith* has named 26 varieties, 6 of which are credited to our region. Very common on the Mohave Desert and the adjoining mountains and interior valleys. Frequent in the coast range from Chatsworth to Ventura. May-June.

4. **L. micranthus** Dougl. Common on the plains and foothills. April-June.

5. **L. polycarpus** Greene. Carpenteria, *Payne*. Var. *grandiflorus* with flowers 10-12 mm. long and foliage of a lighter green. Riverside near Burbank road, *Payne*.

6. **L. nanus** Dougl. Needles.

7. **L. affinis** Agard. Common on shady banks. Feb.-May.

8. **L. truncatus** Nutt. Common on open foothills and valleys. March-May.

9. **L. Stiveri** Kell. Dobbins Ranch, San Bernardino Mts., *Parish*.

10. **L. odoratus** Heller. Frequent on the Mohave Desert from Lancaster to Inyo Co. May.

Var. *pilosellus* Smith. Stem and petioles conspicuously pilose with short white hairs. Mohave River, *Smith*.

11. **L. sparsiflorus** Benth. Frequent in the foothills. April-May.

12. **L. concinnus** Agardh. Mohave and Colorado Deserts and the arid interior.

13. **L. Agardhianus** Heller. (L. gracilis Agardh.) Santa Susanna Pass; Garvanza foothills; hills near Fullerton, *Mrs. Rothwell*. May-June.

14. **L. subhirsutus** Davidson. Colorado Desert, Palm Springs, type locality. May.

15. **L. brevicaulis** Wats. Near Leastalls, N. Y. Mts., *Smith*.

16. **L. Schockleyi** Wats. Mohave and Colorado Deserts. May.

17. **L. hirsutissimus** Benth. Frequent in the foothills.

18. **L. cytisoides** Agardh. (L. rivularis.) Frequent along running streams in the foothills and mountains. April-August.

19. **L. inyoensis** Heller. Ice House Canyon, Upper Transition Zone, San Antonio Mts., *Johnston;* Mt. Markham, *Kessler;* Common on Bishop Creek, Inyo Co., type locality.

20. **L. Sitgreavesii** Wats. Bluff Lake, *Parish.*

21. **L. confertus** Kell. Common in meadows at Bear Valley. June-July.

22. **L. clementinus** Greene. San Clemente Island.

23. **L. hyacinthus** Greene. San Jacinto Mt.

24. **L. formosus Bridgesii** Wats. Common on interior plains and mountains. May-July.

25. **L. Breweri** Gray. Common in sandy ground at Bear Valley. June-July.

26. **L. Chamissonis** Esch. Common but limited to the sand dunes from San Diego to Santa Barbara. Flowering nearly continuously.

27. **L. Grayi** Wats. Common in the pine belt. June-Aug.

28. **L. Paynei** Davidson. Tapo Ranch, Ventura Co., type locality. Usually found with a trunk 1-2 dm. in diameter. May.

29. **L. molissifolius** Davidson. Foothills from Sierra Madre to Crescenta, Los Angeles Co. May.

30. **L. Hallii** Abrams (L. albifrons Bot. Cal.) Scattered in the foothills and chaparral belt, Los Angeles Co. Flowering nearly the whole season.

31. **L. longifolius** Abrams. Frequent on bluffs along the seashore but not on the sand dunes. Canyons of the Santa Monica mountains. April-June.

32. **L. Brittoni** Abrams. Cottonwood Valley, San Diego Co., June.

33. **L. arboreus** Sims. Hueneme sands, *Payne.* The flowers here are blue with a dull white spot on the banner. April-June.

5. MELILOTUS. Sweet Clover.

Annual herbs with pinnately 3-foliolate leaves, serrulate leaflets and adnate stipules; flowers as in *Trifolium* except that the petals are free from the stamens and deciduous; pod longer than the calyx, 1 or 2-seedel, scarcely dehiscent.

Flowers yellow .... 1. *M. indica.*
Flowers white; plants tall.......................... 2. *M. alba.*

1. **M. indica** All. Very common in damp localities. At present much used as a cover crop in orchards. 1850.

2. **M. alba** Lam. Along waysides and ditches and steadily increasing; flowering almost continuously. Los Angeles. 1890.

4. MEDICAGO.

Herbs with characters nearly as in the last; style subulate; pod compressed, falcate or coiled.

Perennial; flowers purple.......................... 1. *M. sativa.*
Annual, flowers yellow.
  Pod spirally coiled; leaves glabrous.
    Margin of pod prickly........................ 2. *M. hispida.*
    Margin of pod not prickly.
      Pod 3-5 mm. broad......................... 3. *M. apiculata.*
      Pod 10 mm. broad.......................... 4. *M. orbicularis.*
  Pod reniform, coiled at the apex; leaves pubescent. 5. *M. lupulina.*

1. **M. sativa** L. Alfalfa. Lucern. Much cultivated; occasionally spontaneous.

2. **M. hispida** Gaertn. Bur Clover. Everywhere common on the lower grounds. *(M. denticulata.)* 1850.

3. **M. apiculata** Willd. Occasional in lawns; Los Angeles, 1903.

4. **M. orbicularis** All. Field near Santa Ana, *Abrams.*

5. **M. lupulina** L. Becoming quite common in lawns and along waysides in Los Angeles. 1891.

7. CYTISUS. Broom.

Shrub with green, very leafy angular branches, pinnately 3-foliolate leaves and entire leaflets and solitary yellow or white flowers; calyx bilabiate; stamens monadelphous; pod compressed, several seeded.

1. **C. canariensis** L. An escape; Arroyo Seco, Pasadena. 1895.

8. ULEX. Furze. Gorse.

Compact shrub with stiff spine-like branches, linear rigid prickly leaves and large yellow flowers, solitary in the axils; calyx bilabiate, toothed at the apex; pod oblong, dehiscent.

1. **U. europaeus** L. On the sands at Playa del Rey. 1911.

Annual or perennial herbs with 3-foliolate leaves and flowers usually in pedunculated heads; calyx with slender subulate teeth; corolla attached to the stamen tube; pods small membranous, dehiscent or indehiscent, seldom exceeding the calyx.

6. TRIFOLIUM. Clover.

Involucre flat.
  Perennial.
    Herbage glabrous.
      Plant large, heads many-flowered; leaflets
        pectinate or denticulate............ 1. *T. Wormskjoldi.*

Plant very small, heads 2-flowered; leaflets setosely serrate .... 2. *T. Grantianum.*
Herbage pubescent; plant small, heads 2-4-flowered .... 3. *T. tenerum.*
Annual.
Flowers not inflated.
Herbage glabrous.
Calyx teeth 3-toothed; leaflets serrate... 4. *T. tridentatum.*
Calyx teeth entire; leaflets minutely spinulose serrate .... 5. *T. variegatum.*
Herbage pubescent, clammy; leaflets lanceolate, spinulose serrate............. 6. *T. obtusiflorum.*
Flowers more or less inflated.
Involucre conspicuous.
Heads 2-5 cm. broad, flowers rose pink; stems fistulous .... 7. *T. fucatum.*
Heads less than 1 cm; flowers purple.... 8. *T. stenophyllum.*
Involucre much reduced with short truncate lobes .... 9. *T. depauperatum.*
Involucre cup-shaped; herbage pubescent........10. *T. microcephalum*
Involucres absent.
Flowers pedicellate, in age reflexed; calyx teeth not plumose.
Annual.
Flowers purple, rose or pink.
Plant glabrous.
Calyx teeth ciliate...................11. *T. ciliolatum.*
Calyx teeth not ciliate.
Leaflets cuneate-obcordate; rachis prolonged above head..........12. *T. gracilentum.*
Leaflets narrowly oblong, acute at both ends ....13. *T. Palmeri.*
Plant villous on peduncles and calyces; leaflets usually deeply bifid. 14. *T. bifidum.*
Flowers yellow ....15. *T. procumbens.*
Perennial.
Flowers white ....16. *T. repens.*
Flowers salmon colored or purple; calyx teeth villous ....17. *T. Rusbyi.*
Flowers nearly or quite sessile, not reflexed.
Perennial.
Heads sessile, flower rose-purple..........18. *T. pratense.*
Heads peduncled; flowers white (sometimes purplish) ....19. *T. longipes.*
Annuals; calyx teeth plumose.
Corolla slightly exceeding the calyx teeth at maturity.
Heads sessile ....20. *T. Catalinae.*
Heads with peduncles 2 cm. or more long ....21. *T. Traskae.*
Corolla nearly equalling the calyx teeth, calyx tube 1 mm. long.............22. *T. neolagopus.*
Corolla concealed, shorter than the calyx teeth ....23. *T. insularum.*

1. **T. Wormskjoldii** Lehm. Frequent along streams and in wet mountain meadows.

2. **T. Grantianum** Heller. San Jacinto Mt., Ontario Peak, *Johnston;* San Gorgonio, type locality.

3. **T. tenerum** Eastw. Common in wet places San Bernardino Mts. July.

4. **T. tridentatum** Lindl. Frequent and ranging from the plains to the pine belt. March-April.

5. **T. variegatum** Nutt. Grassy slopes from the chaparral to the Transition Zone in all our mountains; not uncommon. May-June.

6. **T. obtusiflorum** Hook. Occasional along mountain streams San Jacinto; Forest Home; San Gabriel Mts. June.

7. **T. fucatum** Lindl. Elysian Park; near Chatsworth Park, *Abrams.* April.

8. **T. stenophyllum** Nutt. Occasional in sandy soil, Los Angeles and Orange Co's.

9. **T. depauperatum** Desv. Occasional on dry plains.

10. **T. microcephalum** Pursh. Common on the open slopes in the foothills and mountains. April-July.

11. **T. ciliolatum** Benth. Common below 800 meters. April-May.

12. **T. gracilentum** T. & G. Common on the plains and foothills and occasionally in the mountains. March-May.

Var. *inconspicuum* Fernald. Flowers inconspicuous and paler; calyx teeth more slender, as long or longer than the flower, Pasadena; San Bernardino Valley, type locality.

13. **T. Palmeri** Wats. Catalina and San Nicholas Islands, *Kennedy.*

14. **T. bifidum** Gray. Morgan Station, East Los Angeles; San Diego Co.

15. **T. procumbens** L. Occasional in lawns.

16. **T. repens** L. Dutch Clover. In common use as supplementary cover in lawns.

17. **T. Rusbyi** Greene. Frequent in Bear Valley; San Jacinto Mt. July.

18. **T. pratense** L. An occasional casual.

19. **T. longipes** Nutt. Frequent in meadows at Bear Valley. June-August.

20. **T. catalinae** Wats. Catalina Island, March.

21. **T. Traskae** Kennedy. Catalina Island. April.

22. **T. neolagopus** Loja. (*T. Macraei albopurpureum* of local lists.) Common on grassy hillsides throughout southern California. May-June.

23. **T. insularum** Kennedy. Catalina Island.

9. VICIA. Vetch. Tare.

Slender annuals or perennials climbing by tendrils at the end of the pinnate leaves; stipules semi-sagittate; flowers purple or bluish in axillary racemes; calyx 5-toothed; wings of the corolla adnate to the keel; stamens more or less diadelphous; style filiform, hairy all round or only on the back of the apex; pod flat, 2-valved, several seeded.

Perennial; peduncles 3-8-flowered; flowers 15-18 mm. long.
  Herbage glabrous or nearly so; peduncles 4-8-flowered; flowers bluish............... 1. *V. americana.*
  Herbage villous-pubescent; peduncles 3-5-flowered; flowers purple .... 2. *V. californica.*
Annual; flowers 1-2 in the axils.
  Flowers 15 mm. long, pedicels 2 mm. long......... 3. *V. sativa.*
  Flowers 6 mm. long, peduncles long.
    Leaflets obtuse .... 4. *V. exigua.*
    Leaflets notched .... 5. *V. Hassei.*

1. **V. americana** Muhl. The typical form has not been found in S. California.

Var. *truncata* Brewer. Leaves truncate and usually 3-5-toothed at the apex. Frequent in the foothills and mountains into the Transition Zone. May-June.

Var. *Linearis* Wats. Leaves all linear. Foothills of San Bernardino, Los Angeles and Orange Co's.

2. **V. californica** Greene. Summit, Mt. Santiago; Cuyamaca Mts., *Abrams.*

3. **V. sativa** L. A rare casual.

4. **V. exigua** Nutt. Frequent in the foothills throughout the south. April-May.

5. **V. Hassei** Wats. Foothills of the Santa Monica mountains, type locality. May.

10. LATHYRUS. Pea.

Much resembling *Vicia* but the flowers larger with the banner more recurved and the style flattened near the apex and hairy along the inner side.

Flowers white or purple.
Stipules large, almost half as large as the adjacent leaflet.
Lateral calyx teeth almost equalling the tube; flowers purple .... 1. L. *Alefeldi.*
Stipules small or minute, not half as large as the adjacent leaflet.
Lateral calyx teeth much longer than the tube; flowers purple .... 2. *L. violaceus.*
Lateral calyx teeth about equalling the tube; flowers white .... 3. *L. laetiflorus.*
Flowers deep rose-purple........................ 4. *L. splendens.*

1. **L. Alefeldi** White. Frequent in the foothills of the interior valleys, *Abrams.* San Diego, type locality.

2. **L. violaceus** Greene. Frequent in the chaparral and Transition Zones. May-June.

3. **L. laetiflorus** Greene. Ranges with the last.

4. **L. splendens** Torr. On the Mexican border; banks of the Mohave River, *Howard.*

11. OXYTROPIS.

Like *Astragalus* in most particulars, but distinguished by the short subulate prolongation or beak of the keel.

1. **O. oreophila** Gray. Summit of San Gorgonio Mt., type locality.

12. ASTRAGALUS. Rattle-weed. Loco-weed.

Herbs with unequally pinnate leaves, no tendrils, persistent stipules, and axillary spikes or racemes of usually white flowers; calyx 5-toothed; petals with slender claws, the keel obtuse; stamens diadelphous (9 and 1); pods various, bladdery inflated, thin and flat or rigid and coriaceous, straight or variously curved, 1-celled or 2-celled by the intrusion of one or both sutures; seeds few or many.

Annual.
Pods didymous (not inflated), 4-5 mm. long, wrinkled, 2-seeded.
Flowers dull purple.
Pods deflexed............................ 1. *A. nigrescens.*
Pods not deflexed........................ 2. *A. didymocarpus.*
Flowers white; leaves small, narrow............ 3. *A. dispermus.*
Pods not didymous.
Pods linear falcate, 2-celled; flowers violet tipped.
Calyx whitish haired.
Pod of equal width throughout............ 4. *A. Nuttallianus.*
Pod broadest at the apex, psuedo stipitate at base .... 5. *A. albens.*

Pod acutely beaked .... 6. *A. acutirostris.*
Pods linear; calyx blackish hairy; flowers few in a head .... 7. *A. strigosus.*
Pod inflated, 12 mm long, 1-celled; flowers yellowish white, 4 mm. long................ 8. *A. aridus.*
Perennial.
Pods bladdery inflated.
Pods 2-celled.
Pods reticulated, glabrous.................. 9. *A. Nevinii.*
Pods smooth, slightly puberulent............10. *A. lentiginosus.*
Pods 1-celled.
Pods stipitate.
Pods tapering at base, stipe 12 mm. long....11. *A. leucopsis.*
Pods blunt at both ends, stipe 8 mm. long...12. *A. trichopodes.*
Pods sessile in the calyx.
Pods 2.5 cm. or more long.
Stipules broadly triangular, distinct......13. *A. pomonensis.*
Stipules subulate, pubescent............14. *A. Parishii.*
Stipules herbaceous, deflexed............15. *A. oocarpus.*
Pods 15 mm long.
Pods glabrous ....16. *A. Vaseyi.*
Pods villous, on cone-like spike..........17. *A. Hornii.*
Pods cartilaginous and woolly or densely haired.
Pods 1-celled; plants low, tufted.
Flowers yellow ....18. *A. Purshii.*
Flowers purple above, lighter below.........19. *A. leucolobus.*
Pods 2-celled, plants erect.
Flowers dark purple; calyx cylindrical, dark haired ....20. *A. malacus.*
Pods not inflated, nor long haired or woolly.
Pods 1-celled.
Pods long stiped.
Pods compressed, tapering at base, stipe 8 mm. long ....21. *A. Antiselli.*
Pods flat, obtuse at base, stipe 12 mm. long.22. *A. filipes.*
Pods short stiped.
Pods hirsute, cartilaginous, much curved, sulcate above ....23. *A. bicristatus.*
Pods glabrous, ovoid, with subulate tip......24. *A. Preusii.*
Pods sessile.
Flowers purplish red, 30-40 mm. long; leaves villous ....25. *A. grandiflorus.*
Flowers white or whitish.
Pods 2-2.5 cm. long, bisulcate, nearly 2-celled ....26. *A. consectus.*
Pods ovate, lenticular; flowers in crowded spikes ....27. *A. pycnostachys.*
Pods 2-celled.
Flowers yellowish white; pods arcuate........28. *A. tricarnatus.*
Flowers light purple.......................29. *A. Brauntoni.*
Flowers purplish; pod narrowly oblong, 15-20 mm. long, obcordate on section........30. *A. mohavensis.*

1. **A. nigrescens** Nutt. Occasional on foothill slopes both coast and inland. May.

2. **A. didymocarpus** H. & A. Frequent on grassy banks in the coast range and extending to San Bernardino, where it is rather rare. May.

3. **A. dispermus** Gray. Palm Springs, Colorado Desert; Mohave Desert. April-May.

4. **A. Nuttallianus** DC. Sandy plains from Winchester to the Colorado River; Cushenberry Springs and Goffs', Mohave Desert, *Parish*. May.

5. **A. albens** Greene. Cushenberry Canyon, type locality.

6. **A. acutirostris** Gray. Mohave Desert. May-June.

7. **A. strigosus** Gray. Occasional in the Santa Monica mountains.

8. **A. aridus** Gray. Common at Mecca, Colorado Desert. May.

9. **A. Nevinii** Gray. Catalina Island. *A. Traskiae* Eastw. from San Nicholas Island has the pod woolly but seems otherwise similar.

10. **A. lentiginosus** Dougl. Mohave and Colorado Deserts; Bear Valley; San Antonio Mts.

Var. *Coulteri* Benth. Leaves silvery-silky; pod hoary. Mohave and Colorado Deserts.

11. **A. leucopsis** Torr. Very common along the coast. April-June.

Var. *pachypus* Greene. Pod broader and shorter, stipe equalling calyx. Tejon Pass.

12. **A. trichopodes** Gray. Carbon Canyon, Pomona, *Johnston*.

13. **A. pomonensis** Jones. From Los Angeles to Ontario along the foothills. May-June.

14. **A. Parishii** Gray. San Jacinto; San Bernardino and San Antonio Mts., at 1,500-1,800 m. alt.

15. **A. oocarpus** Gray. From the Palomar Mts., south and west in San Diego Co.

16. **A. Vaseyi** Wats. Occasional in the Colorado Desert around Palm Springs and Whitewater; Split Mt., *Parish*.

17. **A. Hornii** Gray. Alkaline flats at Alamitos, *Parish*.

18. **A. Purshii** Gray. Tejon Pass.

19. **A. leucolobus** Jones. Bear Valley and Holcomb Valley, *Parish*.

20. **A. malacus** Gray. Very common on the southern border of the Mohave Desert. July.

Var. *layneae* Greene. Pods narrower with a wider sulcus. Mohave Desert.

21. **A. Antisellii** Gray. Common on the coast and adjoining hills. May.

22. **A. filipes** Torr. Mohave River; near Crane Lake, *Parish.*

23. **A. bicristatus** Gray. San Bernardino; San Gabriel and San Antonio Mts. June.

24. **A. Preusii** Gray. Frequent on the Mohave and Colorado Deserts. May.

25. **A. grandiflorus** Wats. Common on the borders of both deserts. May.

26. **A. consectus** Sheldon. Tejon Pass.

27. **A. pycnostachys** Gray. In low grounds near the sea in Los Angeles Co. May-June.

28. **A. tricarnatus** Gray. Whitewater Canyon, type station, *Parish.*

29. **A. Brauntoni** Parish. Hills near Sherman. June.

30. **A. mohavensis** Wats. Canyon near Cushenberry Springs, type locality.

13. HOSACKIA.

Herbaceous, rarely suffrutescent, plants with pinnate 2-many foliolate leaves and yellow or reddish flowers in axillary, sessile or pedunculated umbels with or without bracts; stipules gland-like or scarious; calyx 5-toothed; petals free from the stamens, nearly equal, standard ovate or rounded, the claw often remote from the others, wings oboval or oblong, keel slightly incurved, obtuse or acutely beaked; stamens diadelphous; pod linear, compressed or terete, dehiscent, several seeded. *(Lotus.)*

Stipules gland-like.
Annual.
Flowers salmon colored or whitish, solitary, pedunculate and bracted.
Leaflets 1-3 (rarely 5), foliage pubescent...... 1. *H. americana.*
Leaflets 3-5, foliage glabrous or nearly so.... 2. *H. parviflora.*
Flowers yellow, frequently reddish on fading.
Flowers solitary in the axils, short pedicelled, not bracted.
Calyx teeth equalling the tube.
Pod recurved in fruit; plant sparsely villous .... 3. *H. Wrangeliana.*
Pod not recurved; plant villous........... 4. *H. trisperma.*
Calyx teeth much longer than the tube; plant villous .... 5. *H. brachycarpa.*

Flowers peduncled and bracted.
Peduncles 2-4-flowered .... 6. *H. maritima.*
Peduncles 1-2-flowered, flowers 8-12 mm. long.
Foliage glabrous or sparsely pubescent.... 7. *strigosa.*
Foliage densely pubescent................ 8. *H. nudiflora.*
Flowers peduncled and bractless, flowers 4-5 mm. long .... 9. *H. rubella.*
Perennial.
[illegible]
Herbage velvety-pubescent; flowers 15 mm. long.
Flowers yellow becoming red or purple; calyx teeth nearly as long as the tube; plant low; umbel bracted..............10. *H. leucophaeus.*
Flowers deep red; calyx teeth half as long as the tube ....11. *H. confinis.*
[illegible] ....12. *H. grandiflora.*
[illegible] cent ....13. *H. argyraea.*
Stipules scarious: perennials; flowers in bracted umbels.
Leaves thick, glaucous, bracted below the umbel; flowers greenish-yellow, purple-spotted..14. *H. crassifolia.*
Leaves thin, pubescent.
Peduncles 5-7-flowered; leaves oblong or oblanceolate.
Banner reddish-purple; bract subsessile.......15. *H. oblongifolia.*
Banner yellow, wings white; bract sessile....16. *H. Torreyi.*
Peduncles 1-3-flowered; leaves linear-lanceolate, acute; banner yellow with reddish veins.17. *H. lathyroides.*

1. **H. americana** Nutt. (H. Purshiana.) Common and widely distributed on dry sunny slopes of the foothills and in moist meadows in the mountains. June-Sept.

2. **H. parviflora** Benth. Rare, Santa Monica and Santa Ana Mts., *Abrams;* San Gabriel Canyon. May-June.

3. **H. Wrangeliana** Don. Frequent on the foothill plains, especially near the coast. April-May.

4. **H. trisperma** Greene. Mohave Desert and its borders; Harold, type locality. May.

5. **H. brachycarpa** Benth. Foothills and plains, Los Angeles Co., *Abrams;* not common.

6. **H. maritima** Nutt. Widely distributed on coast and interior. March-May.

7. **H. strigosa** Nutt. Common on sandy soils in plain and mountain, the first of the genus to flower. March.

Var. *hirtella* Hall. A xerophytic form with more dense and spreading pubescence and more rounded obtuse leaves. Western boundaries of the Colorado and Mohave Deserts. June.

8. **H. nudiflora** Nutt. Occasional on Mt. Wilson and other San Gabriel peaks.

9. **H. rubella** Nutt. Not uncommon in sandy soil near the coast. April-May.

10. **H. leucophaeus** Greene. North slope of the San Gabriel Mts., from Rock Creek to Manzana; Seven Oaks; rare in the San Jacinto Mts., *Hall.* June-July.

11. **H. confinis** Greene. Mountains of San Diego near the Mexican border.

12. **H. grandiflora** Benth. Rustic Canyon, Los Flores Canyon, Santa Monica Mts.

13. **H. argyraea** Greene. From San Bernardino southwards to near the middle of the Lower California peninsula, *Greene.*

14. **H. crassifolia** Benth. Open forests in the Transition Zone. June.

15. **H. oblongifolia** Benth. Frequent along streams in the lower ranges. May-July.

16. **H. Torreyi** Gray. Frequent in wet places in the San Bernardino Mts.

17. **H. lathyroides** D. & H. River bank, Elysian Park; San Gabriel Canyon, mountains east of San Diego.

14. SYRMATIUM.

Ours, mostly herbaceous perennials differing from Hosackia in having indehiscent pods and flowers in sessile or pedunculated umbels. *(Hosackia.)*

Annual.
- Pod falcate, 6-8 mm. long; umbels subsessile...... 1. *S. Heermanni.*
- Pod linear 15 mm. or more long, curved at base and hooked at apex; umbels sessile.... 2. *S. hamatum.*

Perennial; umbels bracted.
- Herbaceous.
  - Leaves more or less silvery-pubescent.
    - Calyx teeth longer than the tube............. 3. *S. venusta.*
    - Calyx teeth as long as the tube............... 4. *S. ornithopum.*
    - Calyx teeth half as long as the tube or less.
      - Umbels sessile or short peduncled......... 5. *S. argophyllum.*
      - Umbels on peduncles longer than the leaves. 6. *S. Davidsoni.*
  - Leaves pubescent or tomentose, not silvery.
    - Plant erect, tall; pod 3-4 cm. long............ 7. *S. Traskiae.*
    - Plant prostrate; pod about 8 mm. long....... 8. *S. nevadensis.*
- Shrubby or suffrutescent; umbels bractless.
  - Leaves silvery-pubescent; pod straight 15 mm. or more long .... 9. *S. sericeum.*
  - Leaves not silvery.
    - Umbels sessile.
      - Calyx teeth subulate; flowers 6-8 mm. long..10. *S. glabrum.*

Calyx teeth very short and blunt; flowers 6 mm. long ....11. *S. junceum.*
Umbels pedunculate ....12. *S. dendroideum.*

1. **S. Heermanni** Greene. On sandy river bottoms and plains from Los Angeles to San Diego.

2. **S. hamatum** Greene. Catalina Island; Providentia Ranch, Hollywood. April.

3. **S. venusta** Eastw. San Nicholas Island. April.

4. **S. ornithopum** Greene. Channel Islands. May.

5. **S. argophyllum** Greene. Common in the pine belt in all our mountains. June-August.

6. **S. Davidsoni** Greene. Common in the pine belt of the San Gabriel and San Antonio Mts., Mt. Wilson, type locality. June-July.

7. **S. Traskiae** Eastw. San Clemente and Catalina Islands.

8. **S. nevadensis** Wats. Frequent in the Transition Zone, San Bernardino Mts.

9. **S. sericeum** Greene. Desert slope of the San Gabriel Mts., common at Rock Creek. June-July.

10. **S. glabrum** Greene. Very common in the foothills and lower ranges, especially towards the coast.

11. **S. junceum** Greene. Monterey to San Diego, according to Bot. Cal. Redondo; Playa del Rey.

12. **S. dendroideum** Greene. Common in the Channel Islands; near Pasadena. May.

15. ROBINIA. Locust Tree.

A large tree with odd pinnate leaves stipules replaced by stout prickles, and showy fragrant white flowers in pendulous racemes; calyx bilabiate, 5-toothed; stamens diadelphous; pods linear, flat.

1. **R. pseudacacia** L. Established on Los Angeles River, near Hynes.

17. GLYCYRRHIZA. Licorice.

A glandular viscid herbaceous perennial with unequally pinnate leaves and white flowers with purple tipped wings in axillary peduncled spikes; pod short, few-seeded and prickly.

1. **G. glutinosa** Nutt. Widely but sparsely distributed at middle elevations in the interior mountains. May-June.

16. OLNEYA. Ironwood.

A small tree often armed with spines below the leaves; leaves equally or unequally pinnate; leaflets thick, entire; flowers white or purplish, in short axillary racemes; stamens 10, diadelphous; pod thick, linear-oblong, with short glandular hairs.

1. **O. Tesota** Gray. Colorado Desert near the river.

18. HOITA.

Perennial herbs punctate with dark glandular dots with 3-foliolate leaves, with entire short-petioluled leaflets; flowers ochroleucous or purplish in axillary long peduncled spikes or racemes; calyx 5-lobed the lower one larger; keel of the corolla shorter than the wings and purple tipped, the banner broadly ovate with a short curved claw; stamens diadelphous; style bent; stigma bearded; pod indehiscent, short, ovate, equalling the calyx, one seeded. *(Psoralea.)*

Plant erect, glabrous.
Corolla ochroleucous.
Calyx inflated in fruit; leaflets broadly rhombic-ovate to suborbicular.................. 1. *H. physodes.*
Calyx not inflated; leaflets ovate-lanceolate..... 2. *H. rigida.*
Plant erect, more or less pubescent, bracts not surpassing the flowers.
Corolla purplish.
Calyx-lobes equalling the corolla............... 3. *H. macrostachya.*
Calyx-lobes longer than the corolla............. 4. *H. longiloba.*
Plant glandular-scabrous on stem, otherwise glabrous; calyx shorter than the corolla; bracts broad and exceeding the flowers........ 5. *H. Douglasii.*
Plant prostrate; leaves long petioled; peduncles long, erect .... 6. *H. orbicularis.*

1. **H. physodes** Rydb. Dry canyons of the chaparral belt in the San Gabriel and Santa Monica Hills. June-August.

2. **H. rigida** Rydb. Southern part of San Diego County; Oak Grove the type locality; Barton Flats, *Shick.*

3. **H. macrostachya** Rydb. Leather-root, the Hoita of the Indian, widely distributed along streams and wet meadows throughout the Transition Zone. June-July.

4. **H. longiloba** Rydb. Southern California, *N. Am. Flora.*

5. **H. Douglasii** Rydb. Southern California, *N. Am. Flora.*

6. **H. orbicularis** Rydb. Occasional in moist grounds in the interior mountains. June-July.

19. PEDIOMELUM.

Perennials with the general features of *Hoita* but with the leaves palmately foliolate; flowers purple; calyx gibbous on the upper side, its lowest lobe longest; pod with a long lanceolate curved beak, dehiscent. *(Psoralea.)*

Leaves 5-foliolate; banner whitish, wings purple; calyx lobes nearly equal; beak of pod slightly longer than the body.......... 1. *P. californicum.*
Leaves 3-5-foliolate; flowers purple; lowest calyx lobe much the longest; beak of pod nearly twice the length of the body........... 2. *P. castoreum.*

1. **P. californicum** Rydb. Chaparral belt of San Bernardino Mts.

2. **P. castoreum** Rydb. Southern California, *Fl. N. Am.*

20. AMORPHA.

Shrubs with glandular-punctate odd-pinnate leaves and petiolate entire leaflets; flowers in spike-like racemes; calyx slightly oblique, 5-lobed; corolla blue or purple consisting of banner only; stamens 10, exserted; pod small, 1- or 2-seeded.

Twigs and leaf-rachis with prickle-like glands; calyx teeth over half the length of the tube.. 1. *A. californica.*
Twigs and leaf-rachis without prickle-like glands; calyx teeth very short................. 2. *A. occidentalis.*

1. **A. californica** Nutt. Common in the chaparral belt of the coast ranges from Santa Barbara to San Diego; rarer in the interior.

2. **A. occidentalis** Abrams. Foothills of the San Bernardino Mts., southwards to San Diego, *Abrams.* San Diego River near the mission, type locality. May-August.

21. PSORODENDRON.

Spinescent shrubs of the desert regions with pinnate or small, simple glandular-dotted leaves and racemes of short pedicelled bright blue or purple flowers; calyx lobes in some very dissimilar, in others nearly equal; stamens 9-10, monadelphous; pod oblique, compressed, beaked, exserted, conspicuously glandular-dotted. *(Dalea.)*

Leaves pinnate.

Leaves white-villous-tomentose, leaflets oval or obovate; body of pod 3 times as long as the beak .... 1. *P. arborescens.*
Leaves canescent when young, glabrate in age; body of pod equalling the beak.
  Leaflets not decurrent.
    Leafllets oblong, 1-7........................ 2. *P. Fremonti.*
    Leaflets linear, 5-11........................ 3. *P. Johnsoni.*
  Leaflets decurrent, densely canescent when young, oblong .... 4. *P. californicum.*
Leaves short-hirsute when young, soon glabrate; body of pod one-third longer than the beak; leaflets lanceolate.............. 5. *P. Saundersii.*

Leaves simple.
  Ovules 4-6.
    Leaves early deciduous, leaflets spatulate, white-strigose .... 6. *P. spinosum.*
  Ovules 2; leaves linear, not early deciduous.
    Branches bright green and glabrate; body of pod twice the length of beak.......... 7. *P. Schottii.*
    Branches densely canescent; body of pod equalling the beak........................ 8. *P. puberulum.*

1. **P. arborescens** Rydb. Mohave Desert in the neighborhood of Barstow.

2. **P. Fremonti** Rydb. Providence Mts., *Abrams.*

3. **P. Johnsoni** Rydb. Victorville, *Parish.*

4. **P. californicum** Rydb. Saboba; Banning and the Colorado Desert. May.

5. **P. Saundersii** Rydb. Common on the Mohave Desert northwards to Inyo Co. May.

6. **P. spinosum** Rydb. Colorado Desert. June.

7. **P. Schottii** Rydb. Colorado Desert. May.

8. **P. puberulum** Rydb. Colorado Desert. May.

22. PSOROTHAMNUS.

Shrubs with the general aspect of *Psorodendron* but with the branches conspicuously dotted with red or orange colored glands, the flowers sessile in dense spikes or clusters; pods not exserted. *(Dalea.)*

Flowers rose-purple; leaflets obcordate, short-villous.. 1. *P. polydenius.*
Flowers dark-blue; leaflets linear, white velvety.... 2. *P. Emoryi.*

1. **P. polydenius** Rydb. Western Nevada to the Mohave Desert, but probably not within our limits. *P. subnudus* Wats., a closely related and nearly glabrous species, is frequent around Owenyo in Kern Co.

2. **P. Emoryi** Rydb. Colorado Desert. April-May.

23. PAROSELA.

Ours, herbaceous perennials with palmately compound leaves and flowers in spikes or racemes; banner inserted on the hypanthium and long clawed, wings and keel-petals inserted on the staminal tube, the latter usually united at the tip; pod small, indehiscent, 1- or 2-seeded, usually included in the calyx. *(Dalea.)*

Calyx lobes ovate-oblong, silky canescent, shorter than the tube.
  Corolla violet or purple; leaflets 15-30, canescent.. 1. *P. Parryi.*

Calyx lobes filiform, plumose, much longer than the tube.
Corolla rose-colored to white, not shorter than the calyx; stem sparingly pilose........... 2. *P. pilosa.*
Corolla white or pinkish, shorter than the calyx; stem densely pilose.................... 3. *P. mollissima.*

1. **P. Parryi** (T. & G.) Rydb. Colorado Desert, Fort Mohave, type locality.

2. **P. pilosa** Rydb. Southern California, *Fl. N. Am.*

3. **P. mollissima** Rydb. (D. mollis.) Common on the Colorado and Mohave Deserts.

7. GROSSULARIACEAE. Gooseberry Family.

Shrubs usually armed with spines or bristles; leaves alternate, simple, petioled more or less lobed or toothed, rarely entire; inflorescence solitary or racemose on short, lateral branches; flowers regular perfect, (rarely unisexual) hypanthium elongate, short or obsolete; sepals, petals and stamens 5, (except in *R. speciosum*); style 2-lobed, ovary inferior, 1-celled; fruit a berry, seeds few or many.

Stems without nodal spines, (except in *R. montigenum*), pedicels jointed beneath the ovary; fruit breaking from the pedicel.. 1. Ribes.
Stems with nodal spines, bristly or without bristles; pedicels not jointed; fruit not breaking away from the pedicel................ 2. Grossularia.

1. RIBES. Currant.

Stems usually unarmed with palmately veined, lobed leaves, (except *R. viburnifolium*); racemes several to many flowered; pedicels jointed beneath the ovary, a pair of bractlets often present below the joint; hypanthium tubular to campanulate, (not apparent in *R. montigenum*); fruit breaking from the pedicel.

Plants with spines............................... 1. *R. montigenum.*
Plants without spines.
Leaves oval, evergreen......................... 2. *R. viburnifolium.*
Leaves maple-like, deciduous.
Flowers yellow.
Hypanthium 1-1.5 times as long as the sepals. 3. *R. aureum.*
Hypanthium twice as long as the sepals....... 4. *R. gracillimum.*
Leaves rugulose above, tomentose beneath.
Flowers pink, 8-10 mm. long................... 5. *R. malvaceum.*
Flowers white, 5-6 mm. long.................. 6. *R. indecorum.*
Leaves thin, nearly glabrous.
Flowers rose colored, petals white............. 7. *R. nevadense.*
Flowers greenish white......................... 8. *R. cereum.*

1. **R. montigenum** McCl. Summit of Mt. San Antonio, (type station); Mts. San Gorgonio and San Jacinto. Not infrequent on Bishop Creek, Inyo Co. at 2,000 m. July.

2. **R. viburnifolium** Gray. One of the less common shrubs of the eastern shore of Catalina Island; on the mainland from Del Mar to Lower California. April-May.

3. **R. aureum** Pursh. An Arizona species that probably reaches our southeast border. March-April.

4. **R. gracillimum** Cov. & Britt. On Los Angeles River near Universal City this shrub forms quite a thicket; elsewhere it occurs in isolated clumps in the foothill canyons of the Santa Monica and San Gabriel Mountains. Feb.

5. **R. malvaceum** Smith. Not infrequent in the foothills of the Coast Ranges of southern California; less common in the interior mountains. March-April.

6. **R. indecorum** Eastw. Foothills and Upper Sonoran Zone from Santa Barbara to San Diego, but not common. Dec.-Feb.

7. **R. nevadense** Kell. Ranges throughout the pine belt of the San Antonio, San Gabriel, and San Bernardino Mts. June-July.

8. **R. cereum** Dougl. From 2,000 m. upwards in the San Jacinto, San Bernardino and San Antonio Mts. June, July.

2. GROSSULARIA. Gooseberry.

Stems armed at the nodes with simple or 3-forked spines; leaves rotund, 3-5 lobed, the lobes of variable depth, racemes few-flowered, the flowers bracteate, pedicels not jointed; ovary often spiny; hypanthium evident, fruit not separable from pedicel.

- Flowers 4-merous, red with much exserted stamens.. 1. *G. speciosa.*
- Flowers 5-merous.
  - Fruit with bristles.
    - Bristles gland-tipped, and leaves glandular-puberulent .... 2. *G. amara.*
    - Bristles not gland-tipped.
      - Leaves sparingly pubescent on both sides.
        - Sepals greenish red, more than twice the length of the tube.................... 3. *G. hesperia.*
        - Sepals purplish, nearly equalling the tube.. 4. *G. Roezli.*
  - Fruit smooth.
    - Sepals purple, stamens exserted............ 5. *G. Parishii.*
    - Sepals yellow, berry glandular............ 6. *G. velutina.*
    - Sepals yellow, berry glabrous............ 7. *G. quercetorum.*

1. **G. speciosa** Cov. & Britt. Common in the foothills of the Coastal Ranges. Less frequent in the Lower Transition Zone in the San Brnardino and San Jacinto Mts. April, May.

2. **G. amara** C. & B. Ranges through the chaparral belt in the canyons of the San Gabriel (type locality) ; San Antonio and San Bernardino Mts. Dec.-Feb.

3. **G. hesperia** C. & B. Ranges with the last but at a higher altitude; Ventura Mts.; San Gabriel Canyon, type locality.

4. **G. Roezli** C. & B. Widely distributed in the Transition Zone from the Cuyamaca Mts. to the San Gabriel, San Bernardino and San Jacinto Mts. Quite common in the Tehachapi Mts. April.

5. **G. Parishii** C. & B. Rare and local, San Bernardino, type locality; woods near El Monte; Griffith Park, Los Angeles.

6. **G. velutina** C. & B. Mt. Pinos; Tehachapi Mts.; mountains at Haiwee at 1,700 m.

7. **G. quercetorum** C. & B. Mountain slopes from Manzana to Gorman Station; Fort Tejon; Tehachapi Mts.; not common.

8. PLATANACEAE. Sycamore Family.

PLATANUS. Sycamore.

A deciduous tree 10-20 m. high, the bark deciduous in thin brittle plates; leaves large 10-20 cm. in diameter, deeply 5-lobed, tomentose when young; flowers monoecious in ball-like clusters, ours sessile, on a slender peduncle; fruit a compact globe of obpyramidal nutlets with long tawny hairs surrounding the base; the fruit hangs on the tree till the advent of the winter rains.

1. **P. racemosa** Nutt. Common in the rich bottoms of all the streams of the Coastal Ranges; occasional on streams of the desert slopes and in the San Bernardino Mts. March.

9. CROSSOSOMATACEAE.

Shrubs or small trees, leaves alternate, simple entire; flowers terminal; hypanthium turbinate; sepals and petals 5; stamens 15.30; carpels 2-6 distinct, sessile upon a short stipe, coriaceous, follicular, many seeded; seeds in 2 rows, each enclosed in a fimbriate aril.

1. CROSSOSOMA.

Stems much branched, sometimes spinescent; leaf-blades oblong-obovate or elliptic, sometimes fascicled; sepals suborbicular; petals obovate or spatulate, white; follicles spreading or recurved.

Branches not spinescent, leaves more than 2 cm. long; follicles more than 15 mm. long, seeds many.......................... 1. *C. californicum.*

Branches spinescent; leaves less than 2 cm. long; follicles less than 15 mm. long, seeds few .... 2. *C. Bigelovii.*

1. **C. californicum** Nutt. On hill slopes on Santa Catalina (type locality) and San Clemente Islands. March-April.

2 **C. Bigelovii** Wats. Desert border of the San Jacinto Mts. at Palm Springs and S. E. thereof. April.

10. MALACEAE. Apple Family.

Trees or shrubs with alternate, simple or pinnate leaves, the stipules small and fugacious and regular, perfect flowers, in racemes or cymes; hypanthium adnate to the ovary; sepals and petals 5; stamens usually numerous; fruit a pome with papery, bony or leathery carpels.

Leaves evergreen; styles 2-3....................... 1. Heteromeles.

Leaves deciduous; styles 5....................... 2. Amelanchier.

1. HETEROMELES. Christmas Berry. Tollon.

An evergreen shrub or small tree with simple coriaceous, toothed leaves and terminal corymbose panicles of small white flowers; calyx 5-parted, persistent; petals 5, spreading; stamens 10; styles 2-3; fruit a red berry-like pome.

1. **H. salicifolia** Abrams. (H. arbutifolia.) Common in the foothills.

2. AMELANCHIER. Service Berry.

Shrubs or small trees with deciduous, simple, small, usually serrate leaves and white flowers in racemes, terminating the branches; stamens numerous; styles 5; fruit berry-like.

Sepals erect; leaves cuspidate, entire or inconspicuously serrate at apex................. 1. *A. pallida.*

Sepals strongly reflexed; leaves not cuspidate, distinctly serrate above.

  Hypanthium and sepals tomentose without........ 2. *A. venulosa.*

  Hypanthium and sepals glabrous without........... 3. *A. recurvata.*

1. **A. pallida** Greene. Cuyamaca Lake, *Abrams.*

2. **A. venulosa** Greene. San Bernardino and San Gabriel Mts., not common.

3. **A. recurvata** Abrams. Moist places in the Topatopa Mts., Ventura Co., only locality, *Abrams.*

11. AMYGDALACEAE. ALMOND FAMILY.

Trees or shrubs with alternate, petioled, simple, mostly serrate leaves and perfect flowers, solitary, fascicled or in terminal or axillary racemes or corymbs; hypanthium mostly spheroidal, free from the ovary; sepals and petals 5; stamens numerous; fruit a more or less fleshy drupe.

Ovary and fruit glabrous.
  Leaves deciduous.
    Flowers corymbose or umbellate................ 1. CERASUS.
    Flowers racemose .... 2. PADUS.
  Leaves evergreen .... 3. LAUROCERASUS.
Ovary and fruit velvety-pubescent.................. 4. AMYGDALUS.

1. CERASUS. CHERRY.

Spreading shrubs with rigid branches, sharply serrate deciduous leaves and white flowers usually appearing before the leaves; fruit smooth, ovoid, compressed.

1. **C. arida** Greene. (Prunus emarginata Walp. of the Bot. Cal.) Common in the Upper Transition Zone of the San Jacinto, San Bernardino and San Diego Mts.; rare in the San Antonio Mts., *Johnston*. May-June.

2. PADUS. CHOKE CHERRY.

Deciduous leaved shrubs or small trees with simple serrate leaves and white flowers in racemes terminating the branches; drupe globose, small, 1 cm. in diameter or less.

1. **P. demissa** Roem. Common in the Sonoran and Transition Zones from San Jacinto to San Diego. May-June.

3. LAUROCERASUS. EVERGREEN CHERRY.

Trees or shrubs with evergreen ovate, toothed or entire leaves and small white flowers in narrow racemes; drupe fleshy with a large stone. (*Prunus* in part.)

Leaves coarsely spinose-toothed; plant shrubby or arborescent .... 1. *L. illicifolia.*
Leaves usually entire, larger, a small tree............ 2. *L. Lyoni.*

1. **L. illicifolia** Roem. Common on the lower hills throughout southern California.

2. **L. Lyoni** Britt. Catalina Cherry. Canyons near the sea on the Channel Islands.

4. AMYGDALUS. ALMOND.

Divaricate branched shrubs with rigid, sometimes spiny branches, entire or denticulate leaves and white flowers; fruit subglobose, velvety-pubescent.

Leaves narrowly spatulate, entire.................... 1. *A. fasciculata.*
Leaves nearly round, denticulate.................... 2. *A. Fremonti.*

1. **A. fasciculata** Greene. Common at Rock Creek and extending east and west along the north slope of the desert mountains.

2. **A. Fremonti** Abrams. Palm Springs and borders of the Colorado Desert; San Diego Co., *Cleveland.* May.

12. MIMOSACEAE. Mimosa Family.

Shrubs or suffrutescent perennials with usually spiny stems and bipinnate leaves with numerous small leaflets and small flowers in axillary or globose pedunculated spikes; calyx 4-5-parted; stamens 5 to many; fruit a dehiscent or indehiscent, flat, compressed or twisted pod.

Spines hooked; stamens numerous; pods flat, wide, curved .... 1. Acacia.
Spines straight; stamens 10.
  Pods straight or slightly curved.................. 2. Prosopis.
  Pods spirally coiled.............................. 3. Strombocarpus.

1. ACACIA. Acacia.

Ours a shrub or small tree armed with strong hooked prickles; bi-pinnate leaves; flowers perfect or polygamous; calyx 4-5-toothed; petals 4-5, more or less united below; stamens numerous, exserted; pod 7-10 cm. long, curved and contracted between the seeds.

1. **A. Greggii** Gray. Colorado Desert. April-May.

2. PROSOPIS. Mesquite.

Much branched shrubs or trees with large, straight, axillary spines and greenish flowers in axillary spikes; stamens 10, exserted; pod indehiscent, straight or curved.

Leaves glabrous .... 1. *P. glandulosa.*
Leaves pubescent .... 2. *P. velutina.*

1. **P. glandulosa** Torr. Occasional in the Mohave Desert; frequent in the Colorado Desert and eastwards. May-June.

2. **P. velutina** Wooten. Grantville, San Diego, *Abrams.*

3. STROMBOCARPUS. Screw Bean. Tornillo.

A shrub or tree with the general characters of *Prosopis,* but with the stipules spinescent; flowers yellow and the pod spirally twisted.

1. **S. pubescens** Gray. Colorado Desert, June.

13. KRAMERIACEAE. Krameria Family.

Pubescent herbs or woody perennials with simple, alternate or trifoliate leaves and irregular purplish, perfect flowers; calyx of 4 or 5 unequal, petaloid sepals, the 3 upper ones long-clawed, often united by their claws or the middle one wanting, the 2 lower reduced to fleshy glands; stamens 3 or 4, united at the base; pistil simple; fruit a globose spiny indehiscent, 1-seeded pod.

1. KRAMERIA.

Characters of the family.

Peduncles with 2 or 3 pairs of bracts; prickles of the fruit barbed their whole length........ 1. *K. glandulosa.*
Peduncles 2-bracted; prickles barbed only at the apex. 2. *K. Grayi.*

1. **K. glandulosa** Rose & Painter. (K. parvifolia) Rabbit Springs, Mohave Desert, *Parish;* eastern base of Mt. San Jacinto, *Hall;* Jacumba Hot Springs, *Abrams.*

2. **K. Grayi** R. & P. (K. canescens.) Common at Palm Springs and extending along the borders of the Colorado Desert. April-May.

14. CAESALPINACEAE. Senna Family.

Herbs, shrubs or trees with simple or 1-2-pinnate leaves and slightly irregular flowers; calyx 5-toothed; petals imbricated in the bud the superior one within the lateral ones; stamens 10 or fewer, distinct; ovary 1-celled becoming a legume in fruit.

Corolla purple, seemingly papilionaceous.
  Leaves simple .... 1. Cercis.
Corolla yellow, not papilionaceous.
  Leaves once pinnate; stamens 7.................. 2. Cassia.
  Leaves bipinnate, (seemingly 1-pinnate in *Cercidium*).
    Herbs with woody base.......................... 3. Hoffmanseggia.
    Shrubs or trees.
      Pod not compressed, contracted between the seeds .... 4. Parkinsonia.
      Pod compressed, slightly contracted between the seeds .... 5. Cercidium.

1. CERCIS. Red Bud. Judas Tree.

A shrub or small tree with simple, cordate or reniform leaves and rose purple flowers in axillary fascicles, appearing before the leaves; calyx teeth obtuse; stamens 10, distinct; pod shortly stipitate, thin, flat, 2-valved, the ventral suture narrowly winged.

1. **C. occidentalis** Torr. Cuyamaca Mts., *Abrams.*

2. CASSIA. SENNA.

Herbs or herbaceous perennials with abruptly pinnate leaves and yellow flowers in terminal or axillary racemes or clusters; calyx lobes 5; petals 5, nearly equal; stamens 7; pods linear, compressed, several-seeded.

Plant shrubby; leaflets few, distant, roundish, 4-6 mm. long .... 1. *C. armata.*
Plant herbaceous; leaflets few, pubescent, oblong-ovate, obtuse, mucronate, 15 mm. or more long .... 2. *C. covesii.*

1. **C. armata** Wats. Common on the northern border of the Mohave Desert and through Kern and Inyo Co's. April-May.

2. **C. Covesii** Gray. Southern California near the Mexican border.

3. HOFFMANSEGGIA.

Woody based perennial herbs, mostly glandular punctate, with bipinnate leaves, small leaflets and yellow flowers in naked racemes; sepals and petals 5; stamens 10; pod flattened.

Plants herbaceous, low.
  Claws of petals long, densely glandular; filaments glandular .... 1. *H. falcaria.*
  Claws of petals short, glands few; filaments glandless .... 2. *H. drepanocarpa.*
Plants suffrutescent, 3 dm. or more high.
  Petals and filaments glandless.................... 3. *H. microphylla.*

1. **H. falcaria stricta** Fisher. Abundant in grain fields at Coyote Pass, *Payne;* near Santa Ana; Azusa; fields near Alhambra. 1896.

2. **H. drepanocarpa** Gray. Colorado Desert.

3. **H. microphylla** Torr. Frequent on the Colorado Desert; Lancaster. May.

4. PARKINSONIA.

Trees or shrubs with bipinnate leaves and yellow or whitish flowers on slender pedicels in short, loose racemes; calyx 5-parted; petals 5, with claws; stamens 10, free, the filaments pilose at base; pod not compressed, contracted between the seeds.

1. **P. microphylla** Torr. Banks of the Colorado River.

5. CERCIDIUM. PALO VERDE.

Distinguished from the last by the yellow racemes terminating the branches, the presence of a prominent gland on the upper petal, the pod compressed and slightly torulose. *(Parkinsonia.)*

1. **C. Torreyana** Sargent. Common on the Colorado Desert.

ORDER GERANIALES.

Plants with secreting glands in the leaves or bark.
  Leaf blades punctate with oil glands............ 7. RUTACEAE.
Plants destitute of secreting glands or cells.
  Styles united around a central column from which they break away at maturity. 1. GERANIACEAE.
  Styles not united around a central column.
    Leaves simple; stamens 5..................... 3. LINACEAE.
    Leaves compound; stamens 10-15........... 2. OXALIDACEAE.
  Style basal, arising between the nearly distinct carpel-bodies .... 4. LIMNANTHACEAE.
  Style not basal, the carpel-bodies well united.
    Filaments normally appendaged; seeds straight or nearly so .... 6. ZYGOPHYLLACEAE.
    Filaments not appendaged; seeds strongly bent .... 5. KOEBERLINIACEAE.

1. GERANIACEAE. GERANIUM FAMILY.

Ours soft, herbaceous, annual. biennial or perennial plants, with lobed or dissected leaves; flowers regular, complete, in few flowered to peduncled clusters; calyx 5, sepals persistent; petals 5, usually conspicuous; stamens 5-10 filaments united at the base; carpels 5, united around a central column from which they break at maturity, carpels 1-seeded.

Stamens 10; carpel tails not hairy on the inner side.. 1. GERANIUM.
Stamens 5; carpel tails hairy on the inner side...... 2. ERODIUM.

1. GERANIUM. CRANESBILL.

Herbaceous plants with branching stems; leaves opposite, palmately cleft or dissected, pentagonal or rotund in outline; flowers regular, white or pink; stamens 10, filaments usually ciliate near the base; carpels 5, turgid, curling upwards at maturity and remaining attached for a time by the tip of their long beaks.

Plants annual or biennial.
  Petals pink.
    Inflorescence terminated by a pair of glandular puberulent pedicels; carpels pubescent; seeds pitted .... 1. *G. rotundifolium.*
    Inflorescence compact, many-flowered; seeds reticulate .... 2. *G. carolinianum.*
Plants perennial.
  Petals white.
    Leaves hirsute; fruit with long, slender beak.... 3. *G. leucanthum.*
    Leaves pubescent or glabrous; fruit with short, stout beak .... 4. *G. Richardsonii.*

1. **G. rotundifolium** L. Round-leaved Geranium. Sawtelle. 1912.

2. **G. carolinianum** L. Frequent on grassy slopes of the foothills. March-April.

3. **G. leucanthum** Small. San Jacinto Mt. at 2,400 m. Aug.

4. **G. Richardsonii** F. & T. Frequent in open pine woods in the San Bernardino and San Jacinto Mts. June-August.

2. ERODIUM. Storksbill.

In vegetative characters very similar to *Geranium,* but stamens only 5, and the carpel tails long bearded and becoming spirally twisted.

Leaves simple, rounded .... 1. *E. macrophyllum.*
Leaves palmately lobed .... 2. *E. texanum.*
Leaves pinnate.
  Sepals with bristle like appendages .... 3. *E. cicutarium.*
  Sepals without bristle like appendages .... 4. *E. moschatum.*
Leaves pinnatifid; sepals bristle tipped .... 5. *E. Botrys.*

1. **E. macrophyllum** H. & A. Occasional on grassy slopes throughout southern California; very rare in the Santa Monica Range. March-May.

2. **E. texanum** Gray. Colorado Desert. May.

3. **E. cicutarium** L'Her. Alfillerilia. Filaree. The common species of the interior valleys and the mountains. Native of Europe.

4. **E. moschatum** L'Her. Very common and abundant near the coast. Native of Europe.

5. **E. Botrys** Bartol. Only occasional in the south, Perris; Ramona; San Diego 1904. The so-called geraniums in common cultivation in the gardens are Pelargoniums, and nearly all the familiar species may be found as escapes but scarcely established.

2. OXALIDACEAE. Wood-sorrel Family.

Ours, low perennial plants with horizontal or bulb-like rootstocks; leaves alternate or all basal, palmately 3 to several foliate, the leaflets mostly obcordate; flowers in simple or compound cymes; sepals 5; petals 5, yellow; stamens 10; pistil of 5 united carpels; fruit a capsule.

1. XANTHOXALIS.

Characters of the family.

Rootstocks with fibrous roots.
  Pedicels adpressed-pubescent; capsule finely pubescent .... 1. *X. corniculatus.*

Rootstocks with tuberous roots or nodes.
  Pedicels strigillose; capsule minutely pubescent, shorter than or equalling the pedicel... 2. *X. californica.*
  Pedicels pubescent; capsule densely pubescent, longer than the pedicel............... 3. *X. pilosa.*

1. **X. corniculata** Small. Yellow sorrel. A garden escape well established in lawns.

2. **X. californica** Abrams. Common in the chapparal belt throughout southern California; Onofre Mountains, San Diego County, type locality. April-June.

3. **X. pilosa** Small. Southern California, *N. Am. Flora;* Santa Barbara, type locality.

3. LINACEAE. FLAX FAMILY.

Herbs or shrubs with mostly alternate leaves; stipules wanting or mere glands; flowers perfect, regular, mostly axillary to bracts that are miniature leaves; calyx persistent, sepals 5, rarely 4-6; petals 5, rarely 4-6, early deciduous; stamens equalling the sepals, united at the base and sometimes bearing alternating staminodia; carpels 5, each more or less 2-celled by partial or complete membranous partitions.

Flowers blue, large.
  Filaments dilated at the base...................... 1. LINUM.
Flowers white or pinkish, minute.
  Filaments 2-toothed at base..................... 2. HESPEROLINON.

1. LINUM. WILD FLAX.

Annual or perennial, glabrous herbs, sometimes woody at base, with alternate, narrow entire leaves; flowers 5-parted, on slender pedicels, petals large, blue, early deciduous; filaments dilated and united at the base, alternating with the staminodia; style 5; carpels 5, with incomplete false septae.

Annual, inner sepals ciliate........................ 1. *L. usitatissimum.*
Perennial, sepals not ciliate....................... 2. *L. Lewisii.*

1. **L. usitatissmum** L. Casual in streets of Los Angeles. 1891.

2. **L. Lewsii** Pursh. Common in the Transition Zone, in the San Bernardino and San Jacinto Mts. June-August.

2. HESPEROLINON.

Ours slender dichotomously branched annuals, with narrow linear entire leaves; flowers 4 mm. long, white or pinkish, mostly nodding on filiform pedicels, 5-parted; filaments united at the base and 2-toothed; styles 3; capsules 3-celled with incomplete partitions. *(Linum.)*

1. **H. micranthum** Small. Dry hills at Newhall. May.

4. LIMNANTHACEAE. False Mermaid Family.

Glabrous annuals with alternate pinnately dissected leaves, without stipules, with regular, long peduncled solitary flowers; sepals 3-5 persistent; petals 3-5; stamens twice as many as the petals and alternating with an equal number of small glands; carpels as many as the sepals; styles united to near the top, rising in the center between the ovaries; stigma simple; fruit 1-seeded nutlets.

1. LIMNANTHES.

Low diffuse annuals, growing in wet ground, with conspicuous 5-parted flowers, ours with yellow white-tipped petals; styles 5, cleft at the apex.

1. **L. Douglasii** R. Br. Meadow Foam. Marshy ground near Gardena; Temescal. May.

5. KOEBERLINIACEAE. Junco Family.

Trees or shrubs, almost leafless, the numerous stiff branchlets terminated by a stiff spine; leaves alternate, scale-like; flowers in axillary racemes; sepals 4-5 minute; petals 4-5, white; stamens as many or twice as many as the petals; fruit a capsule or a berry.

1. CANOTIA.

A leafless shrub or small tree with spinose branches and smooth, green bark; flowers 5-parted, in lateral racemes; petals white, about 5 mm. long; fruit a 5-celled capsule.

1. **C. holocantha** Torr. Not uncommon in Arizona and entering California in the neighborhood of Needles. May.

6. ZYGOPHYLLACEAE. Caltrop Family.

Trailing herbs or shrubs often strongly scented; leaves mostly opposite, compound or 2 to several-foliolate, the leaflets small, entire, often unequilateral; flowers yellow or orange, perfect, regular or nearly so; sepals and petals 5 (rarely 4 or 6); stamens twice as many as the petals; carpels 2-5; fruit a 3-12-celled capsule, separating at maturity into nutlets containing the seeds.

Leaves abruptly pinnate; fruit spiny; prostrate herbs. 1. Tribulus.
Leaves 3-foliolate; fruit smooth; herbaceous plants...
Leaves 2-foliolate; fruit densely hairy; strong-scented 3. Covillea.
shrub .... 2. Fagonia.

1. TRIBULUS. Burnut.

Loosely branched hairy prostrate herbs, with abrupt pinnate opposite leaves and solitary, peduncled yellow flowers; sepals and petals 5; stamens 10; filaments not winged; fruit separating at maturity into 5 bony carpels, each studded with 1-3 stout spines.

1. **T. terrestris** L. Long Wharf, Santa Monica, 1902. Establishing itself along railway tracks and roadsides.

2. FAGONIA.

Diffusely branching undershrubs with opposite 1-7-foliolate leaves, mucronate, entire leaflets, spinose stipules and solitary peduncled rose-colored or purplish flowers; sepals 5, caducous; petals 5, unguiculate; stamens 10, filaments naked; fruit of 5 one-seeded carpels, deeply 5-angled.

Branches glabrous; beak of fruit 1 mm. long........ 1. *F. californica.*
Branches viscid and glandular; beak of fruit more than 1 mm. long...................... 2. *F. viscosa.*

1. **F. californica** Benth. In the Lower Sonoran belt on the western side of the Colorado Desert. March-April.

2. **F. viscosa** Rydb. San Diego County, *N. Am. Flora.*

3. COVILLEA. Creosote Bush.

Evergreen heavily scented resinous shrub, with nodose branches, opposite 2-foliolate leaves, small stipules, and numerous solitary bright yellow flowers; leaflets small, inequilateral; sepals 5, unequal, caducous; petals 5, obovate twisted; stamens 10 on the 10-lobed disk, filaments winged below with a bifid scale; fruit a densely hairy capsule breaking into 5 indehiscent nutlets. *(Larrea.)*

1. **C. glutinosa** Rydb. One of the common "greasewoods" of the Mohave and Colorado Deserts and the adjacent mountains. It seldom ranges above 1,200 m. April-June.

7. RUTACEAE. Rue Family.

Aromatic shrubs, herbaceous perennials or small shrubs, with glandular-punctate alternate simple or compound leaves without stipules; flowers perfect, polygamous or dioecious, in cymes, short racemes or spikes; sepals 3-5; petals 3-5, dull colored, small; stamens as many or twice as many inserted on a hypogonous disk; pistils 1-5; fruit a follicle, capsule, samara or berry.

Herbaceous perennial, leaves pinnately divided....... 1. Ruta.
Shrubs; branches spine tipped, leaves small, alternate; fruit a capsule..................... 2. Thamnosma.
Shrubs; branches flexuous, leaves entire, opposite; fruit a berry........................ 3. Cneoridium.

1. RUTA.

Woody based strong smelling herbs, with alternate pinnately divided glandular-punctate leaves; flowers perfect in terminal cymes, 4-5-parted; petals fringed, yellow or greenish; stamens 8-10, hypogonous; fruit a 4-5-celled capsule.

1. **R. chalapensis** L. In alfalfa fields near El Monte. 1894.

2. THAMNOSMA.

A strong scented glandular shrub, much branched and about 1 m. high, with small, alternate entire leaves; flowers 4-parted in terminal racemes; petals boatshaped, purple, becoming whitish in age; stamens 8; capsule leathery, 2-lobed and 2-celled.

1. **T. montana** T. & F. Rather rare on the mountain slopes bordering the desert from Palm Springs to the Colorado River. April.

3. CNEORIDIUM.

Evergreen shrub with opposite or fascicled, linear, sessile, pellucid-punctate leaves; flowers 4-parted; petals oval, white; stamens 8; fruit an oval berry.

1. **C. dumosum** Hook. Abundant in the vicinity of San Diego (type locality) and in the neighboring mountains, becoming gradually less common towards its northern limit, Laguna Beach, Orange Co., *Miss Thekla Mohr.* March-April.

ORDER POLYGALALES.

POLYGALACEAE. Milkwort Family.

Herbs or low shrubs with simple entire leaves and papilionaceous racemose purplish flowers; sepals 5, unequal, the 2 lateral petaloid; petals 3; stamens monadelphous or diadelphous; pods flat, 1- or 2-celled.

1. POLYGALA. Milkwort.

Characters of the family.

1. **P. Fishiae** Parry. A few plants near the halfway house on Mt. Wilson trail; near Sulphur Springs, Ventura, *Abrams;* abundant at Crater Camp in the Santa Monica coast range. *Payne.* June.

ORDER EUPHORBIALES.

Shrubs with watery juice; capsule 1-celled.......... 1. Buxaceae.
Herbs, rarely woody with milky juice; capsule 3-celled .... 2. Euphorbiaceae.
Small aquatic plants; stamen 1; capsule 4-celled..... 3. Callitrichaceae.

1. BUXACEAE.

Monoecious trees or shrubs with coriaceous simple green leaves, without stipules, and regular 4–6-parted perianth free from the compound ovary; distinguished from the *Euphorbiaceae* by the loculicidal capsule; segments of the perianth imbricate in 2 rows; stamens 4 or more; ovary 2-3-celled with as many short styles.

1. SIMMONDSIA.

A low, diffusely branched shrub with opposite entire leaves; staminate flowers clustered upon short axillary peduncles or in short terminal compound racemes, the pistillate axillary and solitary; fruit usually 1-seeded.

1. **S. californica** Nutt. From Palm Springs eastward to Arizona. April.

2. EUPHORBIACEAE. Spurge Family.

Monoecious or dioecious herbs or shrubs with acrid or milky sap; leaves simple, sessile or petiolate, alternate or opposite; stipules present or wanting; flowers axillary or terminal, when involucrate the involucre resembles a calyx and the calyx is much reduced; number of the parts of the perianth varying in staminate and pistillate flowers in the same species; corolla often wanting, especially in pistillate flowers; stamens 1 to many; fruit a 3-celled capsule, each cell with 1 or 2 seeds.

Flowers involucrate; calyx represented by a minute scale at the base of a filament-like pedicel.
  Glands of the involucre without petaloid appendages.
    Stems not terminated by an umbel; involucres clustered .... 1. POINSETTIA.
    Stem terminating in an umbel; involucres in open cymes .... 2. TITHYMALUS.
  Glands with petaloid appendages.
    Herbs .... 3. CHAMAESYCE.
    Shrubs .... 4. TRICHEROSTIGMA.
Flowers not involucrate; calyx of several sepals.
  Petals present at least in the staminate flowers.
    Stamens 10, filaments united .... 5. DITAXIS.
    Stamens 6, filaments distinct .... 6. CROTON.
  Petals none.
    Annuals; foliage stellate-pubescent .... 7. PISCARIA.
    Perennials.
      Herbs.
        Stamens 8 or more; stigmas fringed; leaves ovate-cordate, serrate .... 8. ACALYPHA.
        Stamens 2-5; leaves usually linear, acuminate 9. STILLINGIA.

Shrubs.
  Leaves ovate-oblong, serrate, densely pubescent .... 10. BERNARDIA.
  Leaves palmately lobed, glabrous........ 11. RICINUS.

1. POINSETTIA. POINSETTIA.

Ours, an herbaceous plant with narrowly linear leaves, alternate below, opposite above, with gland-like stipules and involucres in terminal clusters; glands fleshy, solitary or rarely 3 or 4, sessile or short stalked, without appendages; capsules exserted; seeds tuberculate or roughened.

1. **P. eriantha** Benth. Palm Springs and the borders of the Colorado Desert. April.

2. TITHYMALUS. SPURGE.

Annual or perennial upright herbs umbellately branched above; stem leaves alternate, sessile, floral ones opposite; involucres in terminal cymes, the lobes often toothed; glands 4, entire or with horn-like appendages; capsule smooth or warty; seeds pitted. *(Euphorbia.)*

Annual.
  Glands of the involucre with a rotund and entire margin.
    Capsule warty .... 1. *T. dictyospermus.*
  Glands crescent shaped 2-horned.
    Leaves decussate, large, 2-6 cm. long; capsule 8-10 mm. broad........ 2. *T. lathyris.*
    Leaves alternate, smaller.
      Capsule crested .... 3. *T. peplus.*
      Capsule smooth.
        Floral leaves partially connate; leaves serrulate .... 4. *T. crenulatus.*
        Floral leaves not connate; leaf margins erose .... 5. *T. peplidion.*
Perennial .... 6. *T. Palmeri.*

1. **T. dictyospermus** Heller. Frequent in shady places in the foothills. April-May.

2. **T. lathyris** Hill. Gopher Plant. Under alders in San Antonio Canyon, *Johnston.* 1917.

3. **T. peplus** Hill. Seemingly established in gardens, Los Angeles; San Bernardino, 1895.

4. **T. crenulatus** Engl. Occasional in shady canyons. April-May.

5. **T. peplidion** Engl. San Diego.

6. **T. Palmeri** Abrams. Common in the pine belt from San Bernardino to San Diego. June-July.

3. CHAMAESYCE.

Mostly prostrate annuals or perennials with opposite leaves, small, entire or toothed, more or less oblique at base; stipules delicate, entire or fimbriate; involucre axillary; glands 4, usually appendaged; capsule smooth or pubescent; seeds smooth or wrinkled with minute caruncles. *(Euphorbia.)*

Leaves entire.
  Involucres corolla-like, white margined or rose color.
    Plants glabrous, perennial.
      Stipules united into a conspicuous membranous scale, entire or lacerate........... 1. *C. albomarginata.*
      Stipules distinct, minute, ciliate............... 2. *C. polycarpa.*
    Plants pubescent, annual.
      Plant erect; stipules small, ciliate............ 3. *C. melanadenia.*
      Plant prostrate; stipules almost obsolete....... 4. *C. setiloba.*
  Involucres without white margins................. 5. *C. ocellata.*
Leaves serrulate; plants annual.
  Plants glabrous or at least never pilose.
    Stems prostrate.
      Seeds smooth or nearly so.................... 6. *C. serpylifolia.*
      Seeds pitted .... 7. *C. rugulosa.*
      Seeds conspicuously wrinkled longitudinally, not pitted .... 8. *C. glyptosperma.*
  Plants sparsely pubescent or glabrous; stems erect, ascending .... 9. *C. nutans.*
  Plants distinctly pilose or puberulent.
    Leaves round-oval or obovate..................10. *C. hirtula.*
    Leaves linear-oblong with a red blotch in center. 11. *C. maculata.*

1. **C. albomarginata** Small. Very common, and generally distributed.

2. **C. polycarpa** Millsp. Occasional in the foothills from the Santa Ana mountains to San Diego.

3. **C. melanadenia** Millsp. Common on the dry, sunny foothills from Santa Monica to Santa Ana. May-June.

4. **C. setiloba** Small. Colorado Desert.

5. **C. ocellata** Millsp. Near San Bernardino and at Waterman Canyon, *Parish.*

6. **C. serpylifolia** Small. Common on the coastal plains; San Jacinto Mts., *Hall.*

7. **C. rugulosa** Ryd. San Bernardino, type locality.

8. **C. glyptosperma** Small. San Pedro; Fullerton.

9. **C. nutans** Small. A probable introduction, known only from near Santa Ana, *Abrams.*

10. **C. hirtula** Engl. San Jacinto; San Bernardino and San Diego Mts., not common.

11. **C. maculata** L. A casual in Pasadena streets, *Grant,* 1904.

4. TRICHEROSTIGMA.

A straggling shrub with entire, scattered leaves, not oblique at base, on slender petioles and small involucres, solitary and terminal; glands 5, purple with a white margin; capsule warty. *(Euphorbia.)*

1. **T. miserum** Kl. & Grk. Catalina Island; coast of San Diego Co., from Point Loma southwards.

10. BERNARDIA.

A densely stellate-pubescent shrub with thick, alternate, oblong-ovate, dentate leaves on very short petioles and dioecious flowers in axillary clusters; staminate calyx 3- or 4-parted, the pistillate usually 6-parted; petals none; stamens 3-20; ovary 3-celled, 3-ovuled.

1. **B. myricaefolia** Benth. Mohave Desert and eastern borders of the Colorado Desert.

5. DITAXIS.

Erect monoecious herbs or undershrubs with purple juice, alternate simple leaves and flowers in axillary clusters; sepals 4 or 5; petals purplish, alternating with the sepals; stamens 5 or 10, filaments united; styles 3, 2-cleft; fruit a 3-seeded capsule. *(Argythamnia.)*

Leaves oblanceolate, serrate........................	1. *D. serrata.*
Leaves lanceolate; petals hairy........................	2. *D. sericophylla.*

1. **D. serrata** Muell. Arg. Mexican border of the Colorado Desert.

2. **D. sericophylla** Gray. Palm Springs and the borders of the Colorado Desert. April.

6. CROTON.

Pale, scurfy or stellate-hairy plants with alternate, exstipulate, entire leaves and racemose, cymose or solitary, unisexual, apetalous flowers; staminate calyx 4-6 parted; stamens 5-7; pistillate calyx when present 5-parted; styles as many as the ovary-cells; capsule 3-celled.

1. **C. californicus** Muell. Common on dry ground especially toward the coast.

Var. *tenuis* Fergs. Leaves stellate, short petioled, oblong to lanceolate. Common, especially in the interior.

Var. *longipes* Fergs. Leaves oval, only slightly stellate above. Arrowhead.

Var. *mohavensis* Fergs. Leaves oval, small; stems much branched, digitate. Mohave Desert.

7. PISCARIA. Turkey Mullein.

A stout, low, stellately pubescent annual with short but widespread leafy branches, leaves oval, alternate, short petioled; flowers monoecious, apetalous in axillary cymes; calyx in the staminate flowers 5-6-parted, wanting in the pistillate; stamens 6-7; ovary and style densely pubescent; capsule oblong, 4 mm. long. *(Eremocarpus.)*

1. **P. setigera** Piper. A common autumn weed.

11. RICINUS. Castor-bean.

A tall herb or small tree with peltate, palmately lobed leaves and monoecious, apetalous flowers in terminal racemes; calyx of the staminate flowers 3-5-parted; styles 3; ovary 3-celled; capsule spiny; seeds oblong, mottled.

1. **R. communis** L. Well established and perennial in the frostless belt. Native of the tropics.

8. ACALYPHA. Three-seeded Mercury.

A shrub with spreading, rigid branches, alternate, ovate, serrate leaves on short petioles; petals none; staminate calyx with 4 sepals and 8-16 united stamens; stigmas fringed and red; fruit a 3-celled, 3-seeded capsule.

1. **A. californica** Benth. Southwest border of San Diego Co., to Lower California.

9. STILLINGIA.

Herbaceous annuals or perennials with narrow, glabrous, entire or toothed leaves and usually terminal bracteate spikes; staminate flowers several together in the axis of the bractlets; calyx 2-3-lobed; stamens 2-3, exserted; capsule 2- or 3-celled with a single large globose seed in each cell.

Perennial.
  Leaves linear, (occasionally obscurely glandular toothed) .... 1. *S. linearifolia.*
  Leaves linear, 2- or 3-toothed near the base....... 2. *S. paucidentata.*
Annual.
  Leaves spinulose-dentate, 3-nerved from the base, petioles winged; spikes axillary .... 3. *S. annua.*

1. **S. linearifolia** Wats. Occasional on the Colorado Desert and the mountains of San Bernardino, Ventura and San Diego Co's. April-May.

2. **S. paucidentata** Wats. Colorado and Mohave Deserts. May.

3. **S. annua** Mull. Colorado Desert.

3. CALLITRICHACEAE. Water Starwort Family.

Fragile herbs growing in water or mud with opposite entire leaves frequently crowded in rosettes at the ends of the branches; flowers monoecious, axillary and solitary or few in the axils often with 2 membranous bracts; calyx and corolla wanting; stamens 1; pistillate flower with 2 stigmas; fruit 4-lobed, dehiscent; nutlets 4.

1. CALLITRICHE.

Characters of the family.

Fruit sessile; bracts present; leaves notched at apex.. 1. *C. palustris.*
Fruit pedicellate, wing-margined; bracts none; leaves not notched .... 2. *C. marginata.*

1. **C. palustris** L. Pools and ditches, San Diego and San Bernardino Co's.

2. **C. marginata** Torr. Quiet streams near Los Angeles and San Diego.

ORDER SAPINDALES.

Fruit a double samara........................... 4. Aceraceae.
Fruit not a double samara; stamens opposite the sepals.
  Plants with resiniferous tissue; leaves compound 1. Anacardiaceae.
  Plants without resiniferous tissue; leaves compound or simple:
    Leaves simple .... 2. Celastraceae.
    Leaves palmately compound................. 3. Hippocastanaceae

1. ANACARDACEAE. Sumac Family.

Shrubs or small trees with resinous or acrid juice, alternate simple or compound leaves and small flowers in crowded racemes or open panicles; flowers 5-merous; stamens 5-10; ovary superior, 1-celled, 1-ovuled; fruit a drupe.

Flowers appearing before the leaves in small crowded clusters .... 1. Schmaltzia.
Flowers appearing after the leaves.
  Leaves compound, deciduous.
    Leaves trifoliolate .... 2. Toxicodendron.
    Leaves pinnate .... 3. Rhus.
  Leaves entire, occasionally denticulate, evergreen.
    Flowers in crowded racemes; fruit viscid, red... 4. Neostyphonia.
    Flowers in compound panicles; fruit white, glabrous .... 5. Lithraea.

1. SCHMALTZIA. Squaw Berry.

Deciduous much-branched shrub with 3-foliolate leaves, the leaflets obovate-cuneate crenately lobed or incised; flowers yellowish, appearing before the leaves in crowded clusters on very short peduncles; drupes scarlet, viscid-hirsute. *(Rhus.)*

1. **S. trilobata** Greene. A common and widely distributed shrub of the foothills and mountains. Prof. Greene has divided this species into the three following: *S. cruciata* with fruit not villous, type locality Hot Springs, San Diego Co.; *S. straminea* fruit villous, foliage minutely puberulent, type locality Lytle Creek, San Bernardino Co.; *S. malacophylla* fruit villous, foliage densely puberulent, type locality, Griffith Park, Los Angeles.

2. TOXICODENDRON. Poison Oak.

Ours a flexuous-stemmed or climbing shrub with 3-foliolate poisonous leaves, the leaflets entire or incised; flowers inconspicuous, greenish yellow, in panicles shorter than the leaves; fruit globose, glabrous, ribbed. *(Rhus.)*

1. **T. diversifolium** Greene. Generally distributed and very abundant near the sea coast.

3. RHUS. Sumach.

Ours, a shrub with glabrous foliage, long pinnate leaves and serrate leaflets; flowers dull white in a dense sessile thyrsus; fruit red clothed with acid secreting hairs.

1. **R. glabra** L. Chino Canyon, near Palm Springs, *Hasse.*

4. NEOSTYPHONIA. Lemonade Berry.

Evergreen shrub or small tree with rigid coriaceous entire or denticulate leaves and roseate flowers in short crowded racemes; drupes viscid and acid. *(Rhus.)*

Leaves oval, obtuse at both ends; inflorescence puberulent; fruit pubescent, viscid........ 1. *N. integrifolia.*
Leaves ovate, acute at apex; inflorescence glabrate; fruit glabrous, viscid.................... 2. *N. ovata.*

1. **N. integrifolia** Shafer. Common and chiefly in the coast ranges, abundant on the sea shore bluffs near Los Angeles. April-May.

2. **N. ovata** Wats. Extends from Santa Barbara to San Diego in the foothills; less common than the last. April-May.

5. LITHRAE. California Sumach.

An arborescent shrub with oblong or lanceolate entire leaves and numerous small white flowers in compound panicles; fruit small, whitish, glabrous. *(Rhus.)*

1. **L. laurina** Walp. Abundant in some localities but practically limited to the canyons of the coast range and islands. May-June.

2. CELASTRACEAE. Staff-tree Family.

Low shrubs sometimes spinose, leaves alternate or opposite, simple, entire or serrate; flowers commonly in axillary cymes, small, perfect or dioecious; calyx and corolla 4-5-merous; stamens 4-10, commonly inserted on the disk lining the hypanthium; fruit a capsule or drupe, with seeds usually arillate.

Flowers purple; stamens 5; leaves opposite..........	1. Euonymus.
Flowers white; stamens 10; leaves alternate.........	2. Forsellesia.

1. EUONYMUS. Spindle Tree.

A shrub or small tree with opposite usually serrulate, pinnately veined leaves and cymose axillary (in ours 5-merous) purple flowers; stamens 4-5; capsule lobed; seeds with a colored aril, 1 in each cell.

1. **E. Parishii** Trels. Cuyamaca Mts.; San Jacinto Mts., type locality. June.

2. FORSELLESIA.

A small, spiny, green-stemmed shrub with angled twigs and small, entire leaves and small, subsolitary axillary flowers; petals 5, white; fruit follicular, striate; seeds 1 or 2, minutely arillate. *(Glossopetalon.)* .

1. **F. spinescens** Greene. Mohave and Colorado Deserts.

3. HIPPOCASTANACEAE. Buckeye Family.

Shrubs or trees with opposite, palmately 5-9-foliolate, exstipulate leaves; petioles enlarged at the base; flowers irregular, polygamous, showy; sepals or calyx lobes 5; petals 4-5, unguiculate; stamens 5-10; capsule 1 or 2-seeded, seeds large.

1. AESCULUS. California Horse-chestnut.

Ours a tree of medium height with 5-foliolate leaves, the leaflets glabrous, crenate-serrulate; flowers small, petals 4, white or pale rose, subequal; seeds solitary, large, brown.

1. **Ae. californica** Nutt. Santa Barbara Co., Manzana and Fort Tejon. May-June.

4. ACERACEAE. Maple Family.

Trees or shrubs with opposite, palmately lobed or pinnate leaves and small, polygamous or dioecious flowers in axillary or terminal clusters; sepals 4 or 5; petals as many or none; stamens 4-12, inserted on a disk, or the disk wanting; pistil of 2 or more united carpels becoming 2 laterally winged samaras.

1. ACER. MAPLE.

Characters of the Family.

- Petals present.
  - Leaves palmately 5-lobed; fruit hispid............ 1. *A. macrophyllum.*
  - Leaves 3-lobed; fruit glabrous.................... 2. *A. bernardinum.*
- Petals absent.
  - Leaves pinnately or ternately compound.......... 3. *A. negundo.*

1. **A. macrophyllum** Pursh. Large-leaf Maple. From the mountain canyons of the Sierra Madre and San Gabriel ranges to Hot Springs Valley, San Diego Co., its southern limit, acc. to *Jepson;* occasional in the San Bernardino Mts.

2. **A. bernardinum** Abrams. Snow Canyon, San Bernardino Mts., type locality; San Jacinto Mts. This is probably but a regional form of A. glabrum.

3. **A. negundo californicum** Sargt. Box Elder. Santa Barbara Mts., Potato and Edgar Canyons, San Bernardino Mts., *Parish.*

ORDER RHAMNALES.

- Sepals evident; petals involute; fruit capsular or drupaceous; shrubs or trees............ 1. RHAMNACEAE.
- Sepals minute or obsolete; petals valvate; fruit a berry; vines with tendrils.............. 2. VITACEAE.

RHAMNACEAE. BUCKTHORN.

Shrubs, occasionally trees, with mostly simple, evergreen leaves and 4-5-merous small, perfect or unisexual, regular flowers; calyx 4-5 cleft; petals 5, sometimes wanting; stamens as many as the calyx lobes and alternate with them; ovary more or less free, surrounded by a fleshy disk, 2-, 3- or 4-celled; fruit a capsule or a berry.

- Fruit fleshy black, with a 1-3-celled stone.
  - Petals present; young stems glaucous............. 1. ZIZYPHUS.
  - Petals wanting; young stems not glaucous......... 2. CONDALIA.
- Fruit dry or somewhat berry-like, 2-3-seeded.
  - Petals hooded.
    - Calyx lobes deciduous, petaloid; stigmas 3..... 3. CEANOTHUS.
    - Calyx lobes persistent; stigmas 2............... 4. ADOLPHIA.
  - Petals not hooded, minute, sometimes wanting..... 5. RHAMNUS.

1. ZIZYPHUS.

Rigid, spiny shrubs with small, glaucous, ovate or elliptical leaves and 5-merous, small greenish flowers in axillary corymbs; sepals keeled within; ovary 2 3-celled; fruit a pulpy black berry.

- Umbels sessile, drupe beaked........................ 1. *Z. Parryi.*
- Umbels peduncled; drupes beakless.
  - Leaves subglabrous, thin, oblong.................. 2. *Z. lycioides.*
  - Leaves tomentose, thick, elliptic.................. 3. *Z. divaricata*

1. **Z. Parryi** Torr. Western borders of the Colorado Desert. March.

2. **Z. lycioides** Weber. Forming dense thickets on the edge of a dry wash at Mammoth Springs, Colorado Desert, *Parish.*

3. **Z. divaricata** Nels. Mammoth Tank, Colorado Desert, *Trelease.*

2. CONDALIA.

General characters of the last but the leaves spatulate and finely pubescent, the petals wanting.

1. **C. spathulata** Gray. Mesquite, Colorado Desert, *Trelease.*

3. CEANOTHUS. CALIFORNIA LILAC.

Shrubs or small trees some spinescently branched, leaves alternate or opposite, entire or glandular toothed; sepals 5, petaloid; petals 5, long-clawed and hooded; fruit dry, 3-celled, berry-like.

Leaves alternate; flowers racemose or paniculate.
Leaves 3-nerved.
Capsule without horns.
Leaves deciduous; flowers white.
Leaves ovate, pubescent above; capsule smooth .... 1. *C. integerrimus.*
Leaves elliptic, glabrous; capsule rough.. 2. *C. Palmeri.*
Leaves evergreen; flowers blue or white.
Branches not spinescent, leaves glandular-toothed.
Capsule glabrous.
Leaves large, dark green above, white tomentose beneath; a tree...... 3. *C. arboreus.*
Leaves narrowly ovate, glabrous above, appressed silky beneath.. 4. *C. soriedatus.*
Leaves pubescent above, white tomentose beneath .... 5. *C. tomentosus.*
Leaves pubescent above, hirsute beneath .... 6. *C. oliganthus.*
Leaves orbicular, slightly villous, veins deeply impressed......... 7. *C. impressus.*
Leaves oblong, appressed pubescent above, veins beneath pubescent .... 8. *C. austro-montanu*
Capsule loosely villous, twigs densely villous, leaves hairy................ 9. *C. Orcuttii.*
Branches spinescent, leaves entire or few toothed.
Leaves pubescent above; flowers pale blue ....10. *C. divaricatus.*
Leaves glabrous above, puberulent beneath; flowers white................11. *C. cordulatus.*
Leaves pinnate veined, mostly entire.
Capsule without horns.
Leaves glabrous, glossy; twigs spinescent; flowers blue..................12. *C. spinosus.*

Leaves obovate, entire, (occasionally denticulate); flowers umbellate, white ....13. *C. verrucosus.*
Capsule with conspicuous horns; flowers umbellate white ....14. *C. megacarpus.*
Leaves opposite; flowers umbellate.
Leaves entire; flowers white.
Leaves obovate-cuneate, minutely tomentose beneath; horns slender from near top of the capsule ....15. *C. cuneatus.*
Leaves oblanceolate; horns nearly apical.....16. *C. oblanceolatus.*
Leaves elliptic, occasionally denticulate; horns small from near middle of the capsule ....17. *C. Greggii.*
Leaves pungently toothed; flowers blue or white.
Horns of capsule dorsal, spreading; leaves thick, glabrous above...............18. *C. vestitus.*
Horns near summit, erect.
Leaves holly-like, glabrous, flowers blue...19. *C. Jepsoni.*
Leaves densely white-tomentose beneath, margins revolute ....20. *C. crassifolius.*
Leaves nearly glabrous, few-toothed or entire, not revolute..................21. *C. perplexans.*

1. **C. integerrimus puberulus** Greene. Scattered throughout the San Antonio, San Gabriel and San Bernardino Mts., at from 1,500 to 1,800 meters altitude. June-July.

2. **C. Palmeri** Trelease. Transition Zone of the Ventura and Cuyamaca Mts. *Abrams.*

3. **C. arboreus** Greene. A tree 20 to 30 ft. high on Catalina Island. May-June.

4. **C. soriedatus** H. & A. Rare, Sawpit Canyon and Wilson Trail, San Gabriel Mts. March.

5. **C. tomentosus** Parry. Occasional among the chaparral in the San Bernardino and San Diego foothills.

6. **C. oliganthus** Nutt. Limited to the chaparral of the coastal hills from Santa Barbara to the San Gabriel Mts. March-April.

7. **C. impressus** Trelease. Santa Barbara, the type locality.

8. **C. austro-montanus** Abrams. Coniferous forests, Cuyamaca Mountains, the type locality, *Abrams.* July.

9. **C. Orcuttii** Parry. Mountains east of San Diego and Cuyamaca Mts., type locality.

10. **C. divaricatus** Nutt. A frequent chaparral shrub from Santa Barbara, the type locality, to the San Gabriel and San Bernardino mountains. April. The var. *eglandulosus* Torr. with leaves entire and glabrous above, is the common form and is widely distributed in the Upper Sonoran Zone. June.

11. **C. cordulatus** Kell. Ranges at an altitude of about 2,000 meters, Los Angeles and San Bernardino Counties. June-July.

12. **C. spinosus** Nutt. A frequent chaparral shrub from Santa Barbara, the type locality to Los Angeles and Orange Counties. March-April.

13. **C. verrucosus** Nutt. Seven Oaks, San Bernardino; San Diego and neighborhood, the type locality. May-June.

14. **C. megacarpus** Nutt. The most common and earliest flowering species in Los Angeles district, extends north to Santa Barbara, the type locality. January-March.

15. **C. cuneatus** Nutt. Rare and the specimens few, Azusa; Tejon, *Abrams;* Topatopa Mountains; Colton, *Parish;* near Campo, *Abrams.*

16. **C. oblanceolatus** Davidson. Frequent in Bouquet Canyon; type locality. May.

17. **C. Greggii** Gray. In large colonies, San Bernardino Mts.; desert slope of San Jacinto Mt.; May-June.

18. **C. vestitus** Greene. Not uncommon on the desert slopes of the San Gabriel and San Jacinto Mts.; Campo, *Abrams.*

19. **C. Jepsoni** Greene. Hills west of Pomona, *Abrams.*

20. **C. crassifolius** Torr. A not uncommon foothill shrub from Santa Barbara to Los Angeles mountains, the type locality; rare farther south. March-April. The var. *planus* Abrams, has the veins showing through the tomentum and the leaves not revolute. Mountains of Santa Barbara and Ventura Counties, Upper Sonoran Zone. Red Reef Canyon, Topatopa Mts., type locality.

21. **C. perplexans** Trelease. S. W. California, *Robinson;* Thomas Valley, San Jacinto Mt., *Hall.*

Natural hybrids are probably frequent, the most striking from the horticulturists' standpoint is Payne's hybrid, a cross between *C. arboreus* and *C. spinosus.*

4. ADOLPHIA.

Shrub with opposite spinose branches and small, orbicular, opposite entire leaves; stipules small, brown, subpersistent; flowers small in axillary fascicles; petals 5, hooded.

1. **A. californica** Wats. Soledad and Cholas Valley, San Diego, type locality.

5. RHAMNUS. Buckthorn.

Shrubs evergreen or deciduous with simple, alternate leaves and axillary clusters of small greenish, 4-5-merous flowers; petals small or none; fruit a 2-3-seeded rather dry berry.

Petals none, flowers polygamo-dioecious.
Flowers 4-merous; leaves roundish, serrulate, deciduous; twigs spinescent .... 1. *R. crocea.*
Flowers 5-merous; twigs not spinescent.
Leaves ovate, glabrous, spinulose-dentate. 2. *R. ilicifolia.*
Leaves pilose, large toothed; inflorescence gray-velvety .... 3. *R. pilosa.*
Leaves large, glandular, crenate or subentire; a tree .... 4. *R. pirifolia.*
Leaves orbicular, glabrous, toothed.............. 5. *R. insularis.*
Leaves ovate, serrulate, puberulent on midvein beneath .... 6. *R. catalinae.*
Petals minute; flowers perfect.
Leaves oblong or obovate, serrulate, glabrous beneath .... 7. *R. californica.*
Leaves elliptic, mostly entire, yellowish-tomentose beneath .... 8. *R. tomentella.*
Leaves mostly serrulate, hirsutulose beneath....... 9. *R. cuspidata.*

1. **R. crocea** Nutt. A somewhat infrequent foothill shrub of the coastal mountains from Santa Barbara to San Diego. Feb.-March.

2. **R. ilicifolia** Kell. A common shrub of the coast hills, less so in the interior.

3. **R. pilosa** Trelease. Foothills of the San Diego Mountains; Santa Maria Valley, type locality.

4. **R. pirifolia** Greene. Santa Cruz Island.

5. **R. insularis** Greene. Catalina and the Channel Islands.

6. **R. catalinae** Davidson. Hills near Avalon, Catalina Island, type locality.

7. **R. californica** Esch. Coffee Berry. A common shrub of the chaparral.

8. **R. tomentella** Benth. The coffee berry of the interior mountains from Ventura to San Diego Co.

9. **R. cuspidata** Greene. Desert slope of the San Gabriel, San Bernardino and Tehachapi Mts.

2. VITACEAE. Vine Family.

Woody plants mostly climbing by tendrils, leaves usually palmately veined or lobed; flowers small, greenish or whitish in a panicled cymose or thyrsoid inflorescence; calyx 4-5-toothed; petals 4 or 5, caducous; stamens as many as the petals; fruit a 2-celled berry.

1. **Vitis girdiana** Munson. Frequent along streams in the foothills and coastal plain.

ORDER MALVALES.

Anthers 1-celled .... 1. Malvaceae.
Anthers 2-celled .... 2. Sterculiaceae.

1. MALVACEAE. Mallow Family.

Annual or perennial herbs, shrubs or small trees, with simple, alternate, petiolate variously lobed or dissected leaves and with mostly large and showy flowers in spikes or racemes; calyx of 5 sepals more or less united at the base, usually subtended by an involucel of several bractlets; petals 5, united at the base and adnate to the staminal column; pistil of 5 to many carpels with united styles and separate stigmas; fruit a 5 to many-celled capsule of dehiscent or indehiscent, 1 to several-seeded carpels.

Fruit a whorl of carpels, these separating at maturity; staminal column anther-bearing at the summit.
  Carpels indehiscent, 1-seeded; style stigmatic lengthwise on the inside.
    Bractlets wanting; stamens united in phalange in 2 series .... 1. Sidalcea.
    Bractlets 3, distinct; stamens monadelphous..... 2. Malva.
    Braclets 3, united at base; stamens monadelphous 3. Lavatera.
  Carpels dehiscent; style stigmatic at apex.
    Carpels 2-seeded; bractlets 3.
      Carpels pubescent, not septate................ 4. Sphaeralcea.
      Carpels aristate, septate...................... 5. Modiola.
    Carpels 1-seeded.
      Bractlets 3; flowers rose-purple............... 6. Malvastrum.
      Bractlets none; flowers cream colored......... 7. Disella.
  Fruit a loculicidal capsule; staminal column anther bearing below the summit.............. 8. Hibiscus.

1. SIDALCEA.

Ours, perennial herbs with palmately lobed or deeply dissected leaves, (except in *S. Parishii*), small stipules and showy rose-purple flowers in terminal racemes or spikes; calyx 5-cleft; bractlets none; carpels 5-9, indehiscent, beakless.

Herbage cinereous, pubescent; carpels hispid on the back .... 1. *S. californica.*
Herbage green.
  Carpels rugose on the back.
    Stems hirsute or hispid........................ 2. *S. malvaeflora.*
    Stems glabrous or nearly so.................. 3. *S. parviflora.*
  Carpels smooth.
    Stems hirsute; leaves deeply divided, upper leaves completely so; sepals twice the length of the tube .... 4. *S. pedata.*

Stems puberulent; lower leaves orbicular, upper flabelliform, crenate; sepals large, broadly triangular .... 5. *S. Parishii.*
Stems glabrous; leaves orbicular, irregularly toothed, sparsely hirsute................ 6. *S. nitrophila.*

1. **S. californica** Gray. Abundant in Mission Canyon; Cassitas Pass and Santa Inez Mts., Santa Barbara Co.

2. **S. malvaeflora** Gray. Frequent on grassy slopes throughout our region. May-June.

3. **S. parviflora** Greene. In sub-alkaline meadows from Los Angeles to San Bernardino. May-June.

4. **S. pedata** Gray. Common at Bluff Lake and around Bear Valley Dam, the type locality. June-July.

5. **S. Parishii** Robins. Local in the hills north and south of Seven Oaks, the only locality. June-July.

6. **S. nitrophila** Parish. Alkaline meadows at Rabbit Springs, Mohave Desert.

2. MALVA. Mallow.

Herbs with angular or rounded, long-petioled leaves and solitary or axillary or glomerate pinkish flowers with emarginate petals; bractlets 3; fruit a compressed whorl of carpels, popularly known as "cheeses".

Flowers large 3-5 cm. in diameter.................. 1. *M. sylvestris.*
Flowers small.
  Corolla much surpassing the calyx; calyx lobes closed on the mature fruit........... 2. *M. borealis.*
  Corolla little exceeding the calyx.
    Calyx lobes spreading; carpels winged and denticulate .... 3. *M. parviflora.*
    Calyx lobes closed over mature fruit; carpels not winged .... 4. *M. pusilla.*

1. **M. sylvestris** L. In an orchard at Oak Glen near Redlands.

2. **M. borealis** Wallm. Locally established on streets in Los Angeles and old San Bernardino, 1891. May-June.

3. **M. parviflora** L. A very common and widely distributed weed, San Diego, 1862. April-June.

4. **M. pusilla** Smith. Local at Mesmer, *Abrams;* San Pedro. May.

3. LAVATERA. Tree Mallow.

Stout arborescent shrub with long petioled, maple-shaped leaves and large showy flowers; bractlets united at the base in a 3-lobed involucel; carpels 5-8.

Herbage puberulent or glabrate; petals bearded at base; lobes of the involucel lanceolate... 1. *L. assurgentiflora.*

Herbage cinereous-puberulent; petals not bearded at the base; lobes of the involucel spatulate and nearly distinct..................... 2. *L. insularis.*

1. **L. assurgentiflora** Kellogg. Native of the Santa Barbara Islands; San Clemente; Bird Island, Catalina. April-Sept.

2. **L. insularis** Wats. Coronado Islands.

4. SPHAERALCEA.

Perennial herbs or low shrubs with angular or lobed leaves and flowers in small axillary clusters or narrow panicles; bractlets 3; upper half of carpel smooth, lower half strongly reticulate; seeds 2.

Petals vermilion; leaves finely tomentose, ovate-oblong, slightly 3-lobed.................. 1. *S. Orcuttii.*

Petals rose-red; leaves ovate-oblong, lobed; pubescence yellowish; carpels cuspidate...... 2. *S. Fendleri.*

Petals rose-purple; leaves broadly ovate, cordate, tomentulose-canescent .... 3. *S. ambigua.*

1. **S. Orcuttii** Rose. Canso Creek, Colorado Desert, only locality.

2. **S. Fendleri** Gray. Near Santa Monica; Annandale. 1899. April.

3. **S. ambigua** Gray. Frequent on the Mohave and Colorado Deserts. April.

5. MODIOLA.

Prostrate or ascending herbs with rounded palmately lobed and incised green leaves; small dull red flowers, solitary on axillary peduncles; bractlets 3; carpels 15-30, awn-tipped and with septae between the seeds.

1. **M. multifida** Moench. Santa Anita; El Monte, 1892. April-May.

6. MALVASTRUM. False Mallow.

Ours, suffrutescent herbs or arborescent shrubs with the general characters of *Sphaeralcea* but with the ovule and seed solitary.

Annual.

Flowers large, rose-purple, with a crimson spot at base; stems stiff, hispid; leaves reniform, crenate .... 1. *M. rotundifolium.*

Flowers small, roseate; stems slender, decumbent, pubescent; leaves lobed................. 2. *M. exile.*

Perennial: flowers rose-purple.

Upper surface of leaves densely stellate-tomentose and hairy.

Lateral halves of petals not symmetrical.

Bractlets triangular; leaves very large, shallowly 5-lobed .... 3. *M. Davidsonii.*

Bractlets linear; leaves ovate-oblong or shallowly 3-lobed .... 4. *M. orbiculatum.*

Lateral halves of petals symmetrical.

Leaves obscurely lobed, crenate toothed, not cordate at base........................ 5. *M. Fremontii.*

Leaves round, cordate; plant lepidote and silvery .... 6. *M. densiflorum.*

Leaves acutely 5-lobed, crenate-serrate, slightly or not at all cordate.................. 7. *M. Nuttallii.*

Upper surface of leaves green, sparsely stellate-pubescent.

Leaves round, cordate; plant somewhat viscid above .... 8. *M. viscidum.*

Leaves angular, 2-5-lobed, subcordate, toothed, lower surface densely stellate-pubescent.

Flowers in sessile or short peduncled clusters on virgate branches .... 9. *M. Thurberi.*

Flowers loosely paniculate......................10. *M. laxiflorum.*

Flowers chiefly terminal on the branchlets of a close panicle ....11. *M. nesioticum.*

1. **M. rotundifolium** Gray. Colorado Desert from Mecca to the border. April-May..

2. **M. exile** Gray. Colorado and Mohave Deserts; Chatsworth Park, *Abrams.* May.

3. **M. Davidsonii** Robins. San washes San Fernando (type locality) and the neighboring washes of the Tejunga and tributaries. May-June.

4. **M. orbiculatum** Greene. Common in Mint, Bouquet and other canyons of the San Gabriel Mts. May-June.

5. **M. Fremontii** Torr. North slope of the San Gabriel Mts.; San Bernardino Mts. July.

6. **M. densiflorum** Wats. Colorado Desert near San Jacinto Mt.

7. **M. Nuttallii** Abrams. Southern slopes of the Santa Inez Mts.; Las Casitas Pass, type locality. July.

8. **M. viscidum** Abrams. El Nido, San Diego Co., type locality; San Juan Capistrano.

9. **M. Thurberi** Gray. Common in the chaparral belt from Los Angeles to San Diego.

10. **M. laxiflorum** Gray. Not uncommon in the Santa Monica Mts., the type locality; San Bernardino Mts. May-June.

11. **M. nesioticum** Robins. Island of Santa Cruz.

7. DISELLA.

Prostrate perennials, stellate-scurfy or lepidote, with short, stout stems and simple leaves, oblique at the base; flowers solitary or few in the axils, yellowish or cream colored; calyx more or less 5-angled. *(Sida.)*

1. **Disella hederacea** Greene. On compact ground in subalkaline soils, tending to become a weed in irrigated lands in the Imperial Valley. May-Sept.

8. HIBISCUS. Rose Mallow.

Ours, an erect perennial, woody at base with ovate pubescent leaves and axillary light-purple flowers; bractlets 4-9; calyx cleft nearly to the base; seeds densely silky.

1. **H. denudatus** Benth. Borders of the Colorado Desert. March.

2. STERCULIACEAE.

A polymorphous order chiefly of shrubs and trees, related to *Malvaceae* and distinguished from it by the 2-celled anthers.

Shrub; petals absent; calyx petaloid.................. 1. Fremontia.
Herb; petals very small.............................. 2. Ayenia.

1. FREMONTIA. California Slippery Elm.

A stellately pubescent arborescent shrub with alternate, lobed leaves and showy axillary, solitary, short pedicelled flowers; calyx 5-cleft nearly to the base, the lobes large, bright yellow; petals wanting; capsule 4-5-valved.

1. **F. californica** Torr. Common at middle elevations in all our interior mountains. June-July.

2. AYENIA.

Ours, a herbaceous perennial with a woody base, coarsely serrate lanceolate leaves and reddish flowers about 3 mm. long; calyx 5-parted; petals 5; stamens 5, alternating with 5 staminodial lobes.

1. **A. pusilla** L. Palm Springs and the Colorado Desert. April.

ORDER HYPERICALES.

Styles wanting.
  Herbs; placentae axial........................... 1. Elatinaceae.
  Shrubs; placentae basal .... 2. Tamaricaceae.
Styles present.
  Petals united to above the middle................ 3. Fouquieriaceae.

Petals distinct or merely coherent at the base.
  Styles distinct.
    Sepals united into a tube; leaves not pellucid-dotted .... 4. FRANKENIACEAE.
    Sepals distinct; leaves pellucid-dotted.......... 5. HYPERICACEAE.
  Styles united.
    Corolla regular or nearly so; stamens 8....... 6. CISTACEAE.
    Corolla irregular, 1 petal spurred; stamens 5.. 7. VIOLACEAE.

1. ELATINACEAE. WATER-WORT FAMILY.

Low annuals with opposite or verticillate, stipulate, entire or serrate leaves with small flowers solitary or fascicled in the axils; sepals and petals 2-5, distinct and hypogynous; stamens of the same number or twice as many; styles 2-5; capsule 2-5-celled, with septicidal dehiscence.

Flowers 2-4-merous; sepals obtuse; plants prostrate.. 1. ELATINE.
Flowers 5-merous; sepals acute; plants erect......... 2. BERGIA.

1. ELATINE. WATER-WORT.

Small prostrate glabrous annual, growing in water or wet places, with entire leaves and minute, sessile, solitary, axillary flowers; (in ours) sepals, petals and stamens 2; seeds striate longitudinally and transversely.

Leaves obovate; seeds with 9-10 longitudinal and 20-30 transverse striae..................... 1. *E. americana.*
Leaves oblong or oval; seeds with 6-7 longitudinal and 10-12 transverse striae..................... 2. *E. brachysperma.*

1. **E. americana** Arn. On the borders of shallow pools in the Transition Zone in the San Bernardino Mts., *Parish.*

2. **E. brachysperma** Gray. On the borders of pools near the coast in Los Angeles and San Diego Counties.

2. BERGIA.

Erect or semi-decumbent annuals with entire or serrate leaves and with flowers solitary or fascicled in the axils; flowers pedicelled, 5-merous; seeds smooth.

1. **B. texana** Seubert. Lake Elsinore. Sept.-Nov.

2. TAMARICACEAE. TAMARIX FAMILY.

A cultivated shrub with cedar like leaves and large panicles of small pink flowers; flowers 5-merous; stamens 10; styles wanting; placentae basal; seeds hairy.

1. **Tamarix gallica** L. Tamarisk. A well established escape in the Imperial Valley and in southern San Diego Co.

3. FOUQUIERIACEAE. OCOTILLO FAMILY.

Tall shrub with virgate spiny stems, single or fascicled entire leaves in the axils of the spines, the leaves lasting but a short time; the perfect bright scarlet flowers in terminal panicles appearing before the leaves; sepals 5 free; corolla gamopetalous, its 5 lobes spreading; stamens 10; capsule ovoid.

1. **F. splendens** Engl. Ocotillo. Candlewood. Borders of the Colorado Desert and the Arizona border.

4. FRANKENIACEAE. FRANKENIA FAMILY.

Low perennial herbs or suffrutescent shrubs with small entire crowded leaves on numerous fascicled short branches and small pink flowers, these solitary, axillary, sessile; sepals 5, united into a persistent tube; petals 5 (ours, pink with erose tips), clawed; stamens 6; fruit a capsule included in the calyx.

1. FRANKENIA.

Characters of the family.

Herbaceous; flowers pink; styles 3-cleft.
  Leaves obovate to spatulate; petals erose.......... 1. *F. grandifolia.*
  Leaves spatulate to linear, margins revolute, on drying; petals scarcely erose........... 2. *F. campestris.*
Shrubby; flowers white; styles 2-cleft............... 3. *F. Palmeri.*

1. **F. grandifolia** C. & S. Common on alkaline flats near the coast. July-Sept.

2. **F. campestris** Gray. Plains near San Jacinto, *Parish.* Probably all our specimens from the interior belong here.

3. **F. Palmeri** Wats. Borders of salt marshes San Diego Bay.

5. HYPERICACEAE. ST. JOHNSWORT FAMILY.

Herbs with opposite, entire, sessile, exstipulate leaves, these usually black-dotted along the margins; flowers perfect, regular and hypogynous; sepals 5; petals 5, bright yellow with a few black glands; stamens numerous, united at the base into 3 or 5 clusters; styles 3, distinct; fruit a 3-lobed capsule.

1. HYPERICUM. ST. JOHNSWORT.

Characters of the family.

Annual, procumbent, often forming dense mats; flowers very small; stamens 15-20...... 1. *H. anagalloides.*
Perennial erect; flowers large, showy; stamens more than 20 .... 2. *H. Scouleri.*

1. **H. anagalloides** C. & S. Common along streamlets in San Bernardino and San Jacinto Mts. at 1,800 meters. July-Aug.

2. **H. Scouleri** Coulter. Common in the Transition Zone of the San Bernardino, San Jacinto and Tehachapi Mts. Hills near Upland, *Johnston.* July.

6. CISTACEAE. Rock-rose Family.

Ours, suffrutescent perennial plants with alternate simple entire leaves and yellow flowers solitary or corymbose on the ends of the branches; petals 5, ephemeral; sepals 5, bract-like, persistent; stamens about 20; capsule ovoid 1-celled, 3-valved.

1. HELIANTHEMUM. Rock-rose.

Characters of the family.

Plant glabrous below, slightly puberulent above; calyx pubescent; petals 6 mm. long..... 1. *H. scoparium.*
Plant with young parts densely white woolly; leaf margins revolute; calyx villous; petals about [illegible] mm. long.................... 2. *H. Greenei.*
Plant sparsely stellate puberulent below; leaf margins revolute; calyx densely pubescent; petals 12 mm. long.................... 3. *H. Aldersonii.*

1. **H. scoparium** Nutt. Common on dry hills in the coast regions and the adjoining mountains; Catalina Island. April-June.

2. **H. Greenei** Robinson. Santa Cruz Island, only locality.

3. **H. Aldersonii** Greene. This is the common species near Seven Oaks and in the San Bernardino Mts., and extends southwards to the mountains on the southern border of San Diego, the type locality. May-June.

7. VIOLACEAE. Violet Family.

Low annuals or perennials, with simple alternate stipulate leaves and complete irregular flowers; sepals 5; petals 5, irregular, one of them often spurred; stamens 5, the anthers erect or connivent; pistil of 3 carpels, with a single style, becoming a 1-celled capsule with several seeds.

1. VIOLA. Violet.

Characters of the family.

Perennial.
  Acaulescent, leaves undivided; flowers scapose.
    Flowers white, lower petals purple veined....... 1. *V. blanda.*
    Flowers pale violet or purple.................... 2. *V. obliqua.*
  Caulescent; leafy-stemmed.
    Flowers violet; leaves undivided................ 3. *V. adunca.*

Flowers yellow within, often brown-purple without.
Capsule glabrous; leaves undivided.
Leaves rhombic-cordate; plants about 15 cm. high .... 4. *V. pedunculata.*
Capsule pubescent.
Leaves undivided.
Leaves lanceolate, coarsely sinuate toothed 5. *V. pinetorum.*
Leaves divided.
Leaves bipinnatafid .... 6. *V. chrysantha.*
Leaves deeply cleft or lobed............. 7. *V. lobata.*
Annual.
Caulescent; flowers white, tinged with blue and yellow; stipules large, leaf-like............ 8. *V. arvensis.*

1. **V. blanda** Willd. White Violet. Frequent in wet meadows in the Transition and Canadian Zones of the San Bernardino and San Jacinto Mts. July.

2. **V. obliqua** Hill. Cienega Los Angeles, probably now extinct. Cucamonga, *Bot. Cal.;* Seven Oaks, *Parish.* May-June.

3. **V. adunca** Gray. Dog Violet. Frequent in moist places in the Transition Zone, San Bernardino Mts. June.

4. **V. pedunculata** T. & G. Common on grassy slopes especially near the coast. Feb.-April.

5. **V. pinetorum** Greene. Yellow Violet. Common and widely distributed in the pine belt. May-June.

6. **V. chrysantha** Hook. Limited to Bear Valley and its vicinity. July.

7. **V. lobata** Benth. Occasional in the mountains from San Diego to San Bernardino County; Browns' Flat and Cucamonga Canyon, San Antonio Mts., *Johnston.* July.

8. **V. arvensis** DC. Field Violet. Apparently established at Seven Oaks. 1910. July.

ORDER OPUNTIALES.

Plants herbaceous, not succulent.
Flowers perfect; sepals and petals very unlike.... 1. LOASACEAE.
Flowers mostly dioecious; petals minute or none.. 2. DATISCACEAE.
Plants succulent, armed with spines; sepals and petals nearly alike .... 3. CACTACEAE.

1. LOASACEAE. LOASA FAMILY.

Herbaceous annuals or perennials with whitish, often brittle, stems, simple or pinnatifid leaves, clothed with barbed hairs; sepals 5, petals 5, often with 5 petal-like staminodia; stamens 5 to many, the filaments often petaloid; capsule 1-celled with 1-3 parietal placentas; seeds 1 to many

Stamens numerous; style 3-cleft at apex.

Petals 5; seeds not separated by lamellae......... 1. Mentzelia.

Petals 10; seeds separated by lamellae............ 2. Nuttallia.

Stamens 5; styles entire.............................. 3. Petalonyx.

1. MENTZELIA.

Erect annuals with alternate, entire or variously pinnatifid leaves and terminal, solitary or cymose flowers; petals 5, yellow; capsule elongated, cylindric or clavate, dehiscent at the tip; seeds numerous in 1-3 rows, irregularly prismatic, finely tuberculate.

Seeds prismatical with grooved angles.

Petals 4 mm. long or less; leaves entire or sinuate-pinnatifid.

Floral leaves concealing flowers; petals 3-4 mm. long .... 1. *M. micrantha.*

Floral leaves not concealing flowers; petals 2 mm. long; sepals 1 mm. long................ 2. *M. pinetorum.*

Petals 8 mm. long or more; leaves usually deeply pinnatifid.

Capsular hairs pustulate at base; petals 6-8 mm. long .... 3. *M. affinis.*

Capsular hairs not pustulate at base.

Petals 6-8 mm. long; corolla less than 1 cm. wide .... 4. *M. Veatchiana.*

Petals 10-15 mm. long.

Corolla golden yellow...................... 5. *M. gracilenta.*

Corolla coppery orange at base; leaves deeply pinnatifid .... 6. *M. pectinata.*

Seeds irregularly angled, only occasionally grooved.

Petals 5-6 mm. long.

Floral leaves almost concealing capsule.

Leaves sinuate-toothed or pinnatifid; bracts broadly ovate .... 7. *M. congesta.*

Leaves mostly entire; bracts ovate-lanceolate.. 8. *M. Davidsoniana.*

Floral leaves not concealing capsule.

Seeds in 3 rows; one of the floral leaves 12 mm. long, as long as the capsule....... 9. *M. montana.*

1. **M. micrantha** T. & G. In the chaparral belt of the coast ranges from Santa Barbara to San Diego; Catalina Island. May-July.

Var. *stricta* Davidson. Strict in habit; leaves symmetrically toothed. Ojai Valley, *Hubby,* type.

2. **M. pinetorum** Abrams. Frequent in the pine belt at about 1,800 meters, in all our mountains. June-July.

3. **M. affinis** Greene. Occasional in the mountains; frequent on the Mohave Desert. May-July.

4. **M. Veatchiana** Kell. San Antonio Mts., *Johnston;* San Bernardino Mts., *Parish.*

5. **M. gracilenta** T. & G. From Santa Barbara to San Diego, mostly in the coastal plains. May-July.

6. **M. pectinata** Kell. Tehachapi Mts.; Cajon Summit.

7. **M. congesta** T. & G. Once collected on Mohave Desert.

8. **M. Davidsoniana** Abrams. Ranging with *M. pinetorum* throughout the pine belt. June-July.

9. **M. montana** Davidson. Mount Pinos, type locality.

2. NUTTALLIA. Blazing Star.

Erect biennials with pinnatifid or lobed leaves and terminal, showy flowers; calyx tube obconic, sepals 5, persistent; petals 10; stamens numerous; capsule dehiscent at the summit, the placenta with horizontal lamellae between the seeds, seeds flat, winged.

Calyx lobes 2.5 cm. or more long; petals twice as long. 1. *N. laevicaulis.*
Calyx lobes less than 2 cm. long; flowers smaller.
  Sepals distinct to the base; flowers long pedicelled. 2. *N. multiflora.*
  Sepals not distinct to the base.
    Bracts sessile, crowded, concealing the calyx tube .... 3. *N. involucrata.*
    Bracts petiolate, not crowded beneath the calyx tube .... 4. *N. tricuspis.*

1. **N. laevicaulis** Greene. Frequent in dry washes in the interior. June-August.

2. **N. multiflora** Nutt. On the Colorado desert toward the southeastern border.

3. **N. involucrata** Wats. Common on the Colorado Desert. May.

Var. *megalantha* M.&J. Petals 3.5-4.5 cm. long, twice as long as those in the species. With the last but not so common.

4. **N. tricuspis** Greene. Needles.

Var. *brevicornuta* M.&J. Lateral lobes of anthers oblong, about 0.5 mm. long. The lateral lobes of the anthers are acute, 2 mm. long or more in the species. Vicinity of Barstow.

3. PETALONYX.

Shrubby-based perennials, rough with short barbed hairs; leaves alternate; flowers small, yellowish, in terminal heads or short leafy spikes; sepals 5, deciduous; petals 5, long clawed; stamens 5; ovary 1-celled; capsule small, oblong, irregularly dehiscent.

Leaves sessile, entire or few toothed................ 1. *P. Thurberi.*
Leaves petioled, coarsely toothed.................. 2. *P. nitidus.*

1. **P. Thurberi** Gray. Borders of the Colorado Desert. May.
2. **P. nitidus** Wats. Colorado Desert.

2. DATISCACEAE. Datisca Family.

Perennial herbs with alternate, incised and serrate leaves; flowers dioecious in clusters in the axils of the leafy branches; ovary inferior, 1-celled, with 3 parietal placentae; styles 3, bifid; calyx lobes 4-9, unequal; corolla none; stamens usually 10; fruit a capsule.

1. **D. glomerata** B. & W. Durango Root. Common along mountain streams.

3. CACTACEAE. Cactus Family.

Green fleshy-stemmed perennials with jointed or solid, globose or cylindrical, leafless, spiny stems covered with tubercles or ridged, the spines borne on restricted areas known as areoles; flowers large and showy; petals and sepals numerous, the latter mostly petaloid; stamens numerous; fruit dry or fleshy, spiny or smooth.

Stems jointed; spines barbed; glochids present; leaves small, terete, early deciduous.... 1. Opuntia.
Stems not jointed; spines not barbed; glochids wanting; leaves absent.
  Ovary and fruit scaly.
    Plants mostly short; flowers borne in the center of the stem at the apex.................. 2. Echinocactus.
    Plants tall, tree-like; flowers lateral............. 3. Carnegiea.
  Ovary and fruit spiny; flowers lateral............ 4. Bergerocactus.
  Ovary and fruit smooth; stems short............. 5. Mamillaria.

1. OPUNTIA.

Articulated and much branched plants with the joints flat or cylindrical; leaves small, terete and early deciduous, in their axils an areole with many short bristles and usually stout barbed spines; flowers mostly large from the bristly part of the areole; sepals, petals and stamens numerous; fruit usually spiny, dry or fleshy and known as "tunas."

Joints cylindrical, more or less tuberculated.
  Spines with papery sheaths.
    Spines solitary.
      Tubercules diamond shaped; fruit dry, very spiny .... 1. *O. ramosissima.*
    Spines always more than one.
      Fruit dry, spiny; flowers yellow or yellowish.
        Tubercules 2 or 3 times as long as wide.... 2. *O. Parryi.*
        Tubercules less than twice as long as wide.
          Spines very numerous, sheaths white or straw colored .... 3. *O. echinocarpa.*

Spines less numerous, sheaths yellow-brown .... 4. *O. serpentina.*
Fruit fleshy, naked.
Tubercles scarcely longer than broad; flowers magenta .... 5. *O. Bigelovii.*
Tubercles longer than broad; flowers red..... 6. *O. prolifera.*
Spines without sheaths, joints clavate; plant prostrate .... 7. *O. Parishii.*
Joints flat and broad.
Joints seldom over 15 cm. broad.
Fruit dry.
Flowers red or purple.
Joints pubescent, spines none; flowers purple 8. *O. basilaris.*
Joints not pubescent, spines few; flowers red 9. *O. Treleasii.*
Flowers red or yellow; spines many, white, long flexuous ....10. *O. erinacea.*
Fruit fleshy.
Flowers yellow.
Spines subulate, brown; plant prostrate....11. *O. mojavensis.*
Spines acicular, nearly white...............12. *O. Covillei.*
Flowers red ....13. *O. Vaseyi.*
Joints over 15 cm. broad; flowers yellow.
Areoles remote.
Spines brown, more or less flattened; plant tall..14. *O. occidentalis.*
Areoles close, (25 mm. apart).
Plant bushy with a definite trunk; inland species.15. *O. chlorotica.*
Plant bushy, spreading; coast species...........16. *O. littoralis.*

1. **O. ramosissima** Engl. Barstow to the Colorado River.

2. **O. Parryi** Engl. Common in the interior valleys of southern California.

3. **O. echinocarpa** Engl. Mohave and Colorado Deserts.

4. **O. serpentina** Engl. Apparently confined to the coast region at San Diego, the type locality.

5. **O. Bigelovii** Engl. Southern California near the Mexican border.

6. **O. prolifera** Engl. San Pedro; Newport; Catalina Island; San Diego, type locality.

7. **O. Parishii** Orcutt. Mohave Desert.

8. **O. basilaris** Engl. Beaver-tail. Frequent in the interior valleys.

9. **O. Treleasii** Coulter. Mohave Desert; Tehachapi Mts.

10. **O. erinacea** Engl. Grizzly Bear Cactus. Mohave Desert. *(O. ursina.)*

11. **O. mojavensis** Engl. On the Mohave River.

12. **O. Covillei** B. & R. The common cactus of our district usually known as O. occidentalis.

13. **O. Vaseyi** B. & R. Foothills and plains from Riverside Co. to Santa Monica. *(O. rubiflora.)*

14. **O. occidentalis** Engl. Coast of Los Angeles and San Diego Co's.; Catalina Island.

15. **O. chlorotica** Engl. Borders of the Colorado River.

16. **O. littoralis** Cockl. Sea coast from Santa Barbara to San Diego, occasionally in the interior.

2. ECHINOCACTUS.

Globose or short-cylindric plants with tubercles coalescing into vertical or spirally twisted ridges bearing clusters of mostly stout, curved or hooked spines; flower bearing areolae above the spine bearing ones; ovary scaly or woolly, never spiny; fruit dry or fleshy, scaly or smooth.

Some of the spines hooked.
  Spines annulate.
    Central spine solitary; radials 7-9; ribs 13-21.... 1. *E. Emoryi.*
    Central spines 4; radials 12-14; ribs 20-27...... 2. *E. cylindraceus.*
  Spines not annulate; central spines 5-8; radial 20;
      ribs 13-17 .... 3. *E. polyancistrus.*
None of the spines hooked.
  Spines all annulate; central spines 4.
    Spines all rigid; ribs 13-21.
      Fruit dry, woolly.......................... 4. *E. polycephalus.*
      Fruit scaly, never woolly.................... 5. *E. viridescens.*
    Spines, some rigid, many of the radials bristly;
      ribs 21-25 .... 6. *E. Lecontei.*

1. **E. Emoryi** Engl. Valley of the Mohave.

2. **E. cylindraceus** Engl. San Felipe.

3. **E. polyancistrus** Engl. Mohave Desert.

4. **E. polycephalus** Engl. Colorado Desert.

5. **E. viridescens** Nutt. Dry hills near San Diego.

6. **E. Lecontei** Engl. Colorado Desert.

4. BERGEROCACTUS.

Cylindrical plants with the spine-bearing area on vertical ribs; flowers borne close above the old spine-bearing areolae, thus lateral to the stem; ovary spiny; fruit fleshy, covered with spines. *(Cereus.)*

1. **B. Emoryi** B. & R. Mexican border of San Diego Co.; San Clemente Island.

3. CARNEGIEA. SAHUARO.

Tall columnar tree-like plants, some of them 12 meters high; ovary scaly. *(Cereus.)*

1. **C. gigantea** B. & R. A striking feature of the Arizona desert but found in only a few localities on the California side of the Colorado River.

5. MAMILLARIA. Pincushion Cactus.

Small, more or less globose plants with spines borne on oval or conic tubercles which cover the plant; flowers in the axils of the tubercles; ovary and fruit smooth; seeds smooth or pitted.

Tubercles never grooved.
  Central spines 1-3, one hooked.
    Radials 10-15; petals yellowish-white with red midribs .... 1. *M. Goodrichii.*
    Radials 15-30; petals rose colored.............. 2. *M. Grahami.*
  Central spines 3-4, one or more hooked; radials 30-60. 3. *M. tetrancistra.*
Tubercles deeply grooved.
  Central spines more than 1 and none of them hooked 4. *M. arizonica.*

1. **M. Goodrichii** Scheer. Common near San Diego.

2. **M. Grahami** Engl. Borders of the Colorado River.

3. **M. tetrancistra** Engl. Colorado and Mohave Deserts.

4. **M. arizonica** Engl. Flowers red. Along the Mexican Border.

Var. *deserti* Engl. Flowers straw colored with purple tips. San Bernardino Co., near the Nevada border.

Var. *Alversonii* Coulter. Flowers pink; spines black tipped. Borders of the Colorado River.

ORDER MYRTALES.

Styles wanting; aquatics.............................. 1. Gunneraceae.
Styles present; land plants.
  Hypanthium merely enclosing the ovary........... 2. Lythraceae.
  Hypanthium adnate to the ovary.................. 3. Epilobiaceae.

1. GUNNERACEAE. Water Milfoil Family.

Aquatic perennial herbs with alternate or whorled leaves, these dissected when immersed; flowers inconspicuous, sessile in the axils, perfect, monoecious or dioecious; calyx entire or 4-lobed; corolla small or wanting, petals 2-4; stamens 1-8; ovary 1-4-celled; fruit indehiscent, nutlike of 2-4 one-seeded carpels.

Leaves entire; stamen 1; ovary 1-celled.............. 1. Hippuris.
Submerged leaves pinnately dissected; stamens 4-8... 2. Myriophyllum.

1. HIPPURIS. MARESTAIL.

Smooth erect herb with running rootstocks, growing in shallow water; leaves simple, entire, linear, in whorls of 8-12; flowers solitary, perfect; petals wanting; fruit 1-seeded, drupelike.

1. **H. vulgaris** L. Shallow water, Bear Valley.

2. MYRIOPHYLLUM. WATER MILFOIL.

Aquatic herbs with leaves of two sorts, the submerged ones pinnatifid in whorls; flowers monoecious; petals 2-4, wanting in the pistillate flowers; stamens 8; stigmas recurved and plumose; ovary 4-celled.

1. **M. spicatum** L. Abundant at Bear Valley.

2. LYTHRACEAE. LOOSESTRIFE FAMILY.

Herbs with entire leaves and axillary or spicate mostly 5-merous flowers; calyx tubular enclosing the ovary but free from it, the petals and stamens borne on the throat; style 1; capsule mostly 1-celled by the vanishing of the thin partitions; seeds numerous, small, on a central placenta.

Flowers solitary in the axils; leaves alternate....... 1. LYTHRUM.
Flowers 2 or more in each axil; leaves opposite..... 2. AMMANNIA.

1. LYTHRUM. LOOSESTRIFE.

Erect slender herbs with angled stems, linear or lanceolate, sessile, alternate leaves and axillary purple flowers; calyx cylindrical, 10-12-striate, 10-12-toothed, the teeth alternately long and erect and short and recurved; petals 5 or 6, inserted on the throat of the calyx-tube; stamens 5 or 6; capsule cylindrical, 2-celled.

Petals whitish or pale purple, 2 mm. long; flowers subsessile; annual .... 1. *L. hyssopifolia.*
Petals bright purple, 4-6 mm. long; flowers pedicelled; perennial .... 2. *L. californicum.*

1. **L. hyssopifolia** L. Coast mountains of San Diego Co., *Orcutt.*

2. **L. californicum** T. & G. Common in marshy places on the plains and along streams in the mountains. June-Sept.

2. AMMANNIA.

Low, glabrous annual with 4-angled stems, linear, sessile, opposite leaves and purplish axillary flowers; calyx subglobose, 4-angled and 4-toothed, with small accessory teeth in the sinuses; petals 4-6 (usually 6 in ours); stamens 4-8; capsule globular.

1. **A. coccinea** Rottb. On the borders of marshes from Santa Monica to Bixby Slough; San Diego. June.

3. EPILOBIACEAE. Evening Primrose Family.

Annual or perennial herbs, rarely shrubs, with alternate or opposite exstipulate leaves and axillary, spicate or racemose, regular or sometimes slightly irregular flowers; calyx-tube adnate to the ovary, more or less prolonged and often spreading; sepals 2 to 6, usually 4; petals as many; stamens as many or twice as many as the petals and inserted with them on the summit of the calyx-tube, or on the epigynous or perigynous disk; ovary 1-6-celled, usually 4-celled, with one style and a capitate, discoid or 4-lobed stigma; fruit usually a 4-celled capsule, sometimes indehiscent and nut-like.

Flowers 4-6-merous, calyx-tubes not prolonged beyond the ovary, its lobes persistent; flowers yellow, ours prostrate or aquatic plants. 1. Jussiaea.

Flowers 4-merous.

Fruit a many-seeded capsule, opening by valves.

Seeds comose.

Calyx-tube not prolonged beyond the ovary; flowers large .... 2. Chamaenerion.

Calyx-tube somewhat prolonged beyond the ovary.

Tube not inflated above the ovary, without scales within; flowers small, purplish, white or pink........................ 3. Epilobium.

Tube inflated above the ovary, bearing 8 scales within; flowers showy, scarlet.... 4. Zauschneria.

Seeds not comose, naked or tuberculate.

Anthers basifixed, erect.

Flowers minute; calyx-lobes erect........... 5. Boisduvallia.

Flowers showy; calyx-lobes erect or united at the tip and turned to one side in anthesis.

Petals clawed .... 6. Clarkia.

Petals sessile, entire.................... 7. Godetia.

Anthers attached in the middle, versatile.

Capsule 4-celled.

Stigma 4-lobed.

Stamens equal in length; capsule terete or round-angled.

Flowers yellow; seeds in two rows, angled .... 8. Oenothera.

Flowers white or pink; seeds in one row, not angled .... 9. Anogra.

Stamens unequal in length, the alternate longer; capsules with more or less distinct double crests on the angles; seed furrowed along the raphe; plant acaulescent ....10. Pachylophus.

Stigma capitate.
Plant acaulescent; capsules 4-winged; calyx-tube tubular-cylindric .... 11. TARAXIA.
Plant caulescent; capsules not winged; calyx-tube obconic or funnelform.
Capsule more or less clavate, pedicelled and obtuse .... 12. CHYLISMIA.
Capsule linear, sessile, narrowed above.
Calyx-tube with a lobed disk at the throat .... 13. EULOBUS.
Calyx-tube naked at the throat...... 14. SPHAEROSTIGMA.
Capsule 2-celled; flowers minute............ 15. GAYOPHYTUM.
Fruit indehiscent, nut-like.
Fertile stamens 8; anthers attached by the middle, versatile .... 16. GAURA.
Fertile stamens 4, those before the petals sterile; anthers basifixed .... 17. HETEROGAURA.
Flowers 2-merous; fruit indehiscent, obovoid and bristly, with hooked hairs.............. 18. CIRCAEA.

1. JUSSIAEA.

Aquatic or marsh herbs having entire, alternate leaves with very small stipules; flowers yellow; the herbaceous calyx-lobes persistent; capsule clavate, septicidally dehiscent, many-seeded.

1. **J. Californica** Jepson. In stagnant water or muddy bottoms in marshes near the coast.

2. CHAMAENERION.

Perennial herbs with several stems, which are often woody at the base; leaves alternate, mostly lanceolate, nearly entire, short petioled; flowers in terminal racemes; calyx-tube little or not at all prolonged; petals entire, spreading, rose-purple; stamens in a single series with dilated filaments; stigma 4-lobed; capsule linear-fusiform, many-seeded; seeds fusiform, comose.

1. **C. angustifolium** Scop. Occasional along streams in the mountains. San Bernardino Mts.

3. EPILOBIUM. WILLOW HERB.

Caulescent herbs with alternate or opposite, narrow leaves and small axillary or racemose flowers; calyx-tube short-obconic, the limb 4-lobed, deciduous; petals 4, obovate to obcordate; stamens 8; ovary 4-celled; capsule elongate linear-oblong, 4-sided, 4-celled, loculicidally dehiscent; seeds small, comose.

Stigma 4-cleft to subentire; capsules prominently ribbed; seeds beakless, papillate; coma easily falling; slender annual. 1. *E. paniculatum.*

Stigma clavate, entire or slightly notched.
Seeds not prominently papillate.
Leaves mostly small, usually nearly entire.
Plant ascending or nearly prostrate, cespitose; leaves relatively broad and uniformly distributed .... 2. *E. anagallidifolium.*
Seeds under the microscope papillately roughened.
Leaves linear to lanceolate, nearly entire, the lateral veins usually inconspicuous.
Stems glabrous and glaucous, slender, cespitose, stoloniferous .... 3. *E. glaberrimum.*
Leaves lanceolate to ovate, evidently toothed, veiny, not revolute.
Plant rosuliferous, not glaucous.
Flowers small, the petals 3-5 mm. long.
Seeds ellipsoidal, about 1 mm. long, short-beaked.
Leaves narrowly lanceolate.
Plant much branched; leaves often obtuse, not sharply toothed, the uppermost and the twigs silky................ 4. *E. holosericeum.*
Leaves broader, elliptical to ovate-lanceolate.
Not deeply and sharply toothed; petioles often quite short.
Pubescence fine, short-glandular...... 5. *E. adenocaulon.*
Pubescence not glandular.
Finally much branched; lower leaves obtuse; pubescence short and submentose on flower buds.... 6. *E. Parishii.*
Little branched; leaves acute, thin and elongated; pubescence of buds coarse, somewhat spreading 7. *E. Californicum.*
Turioniferous plants, usually simple; not glaucous.
Leaves sessile, medium-sized.
Petals about 5 mm. long; seeds somewhat acute, rather abruptly short-beaked; pubescence long and spreading below 8. *E. ursinum.*

1. **E. paniculatum** Nutt. Frequent in dry ground in the foothills and mountains.

2. **E. anagallidifolium** Lam. Reported by Parish from a meadow at Bluff Lake, in the San Bernardino Mts.

3. **E. glaberrimum** Barbey. Frequent in moderately dry soil in the Transition Zone.

4. **E. holosericeum** Trelease. Frequent in low ground in all our valleys.

5. **E. adenocaulon** Hausskn. In meadows in the Transition Zone. The var. *occidentale* Trelease, which is more remotely leafy, the leaves triangular-lanceolate and very short petioled,

those of the inflorescence small and acute at both ends, has been reported from Catalina Island by *McClatchie.*

6. **E. Parishii** Trelease. Common in damp soil in the valleys and along streams below 4,000 feet.

7. **C. Californicum** Hausskn. In marshes near the coast. Cienega; Alamitos, *Abrams.*

8. **E. ursinum** Parish. Frequent in wet meadows in the Transition Zone. acc. to *Parish.*

4. ZAUSCHNERIA.

Low, decumbent perennials, somewhat suffrutescent at base, having sessile leaves (the lower opposite) and large Fuchsia-like flowers in a loose spike; tube of the calyx funnelform and deeply colored above the ovary, with a small, frequently globose base and a 4-lobed limb, deciduous, appendaged within with 8 small scales, 4 erect and 4 deflexed; petals 4, inserted on the throat of the calyx, obcordate or 2-cleft, scarlet; stamens 8, exserted, the filaments opposite the petals shorter; anthers linear-oblong, attached by the middle; ovary 4-celled; style long and exserted; stigma capitate or peltate, 4-lobed; capsule linear, obtusely 4-angled, 4-valved and imperfectly 4-celled, many-seeded; seeds oblong, comose.

Lateral veins not evident.
Canescent with a dense white tomentum, hairs (under a lens) short and curly.
Leaves narrowly linear, 2-3 mm. wide; calyx divisions ¼ as long as tube; petals scarcely exceeding the calyx .... 2. *Z. cana.*
Leaves linear-lanceolate to linear oblong; capsule long pedicellate .... 1. *Z. microphylla.*
Foliage green, more or less villous and glandular; leaves linear-lanceolate, somewhat falcate; petals exceeding the calyx; stamens well exserted .... 3. *Z. villosa.*
Lateral veins evident; foliage green, more or less villous and glandular.
Leaves lanceolate to ovate or elliptical; capsules fusiform, subsessile .... 4. *Z. latifolia.*
Leaves broadly ovate, abruptly acuminate; plant slimy-viscid .... 5. *Z. viscosa.*
Leaves lanceolate-oblong; flowers small and slender; capsule densely glandular.............. 6. *Z. glandulosa.*
Leaves ovate, acuminate, pilose; flowers small; capsule long-beaked .... 7. *Z. Hallii.*

1. ***Z.* microphylla** Moxley. The common form around Los Angeles. Type collected at Los Angeles, in 1860, by *Brewer.*

2. **Z. cana** Greene. Santa Cruz Island, the type locality, *Greene;* Anacapa Island, *H. Hemphill.*

3. **Z. villosa** Greene. Santa Cruz Island, the type locality *Greene;* San Clemente Island, *Mearns;* Island of Santa Rosa, *Brandegee.*

4. **Z. latifolia** Greene. A somewhat polymorphous species of the mountain region, of which there seem to be several well marked varieties.

5. **Z. viscosa** Moxley. Barley Flats, San Gabriel Mts., the type locality; Mt. Wilson Ridge, *Grinnell & Richter.*

6. **Z. glandulosa** Moxley. Type collected at Strawberry Valley, San Jacinto Mts., by *Winifern W. Swarth;* Idlewyld, *F. M. Fultz;* Bear Valley, *Edwards.*

7. **Z. Hallii** Moxley. Type collected in the San Jacinto Mts. by *Prof. H. M. Hall.*

5. BOISDUVALLIA.

Erect leafy annuals with alternate, simple, sessile leaves and simple or compound spikes small, purple to white flowers; calyx-tube funnelform above the ovary, deciduous; petals 4, obovate-cuneate, 2-lobed, sessile; stamens 8, perfect, unequal; filaments very slender, naked at base; ovary 4-celled, several-ovuled; style filiform; stigma-lobes short, somewhat cuneate; capsule membranaceous, ovate-oblong, nearly terete, acute, sessile, dehiscent to the base; seeds in 1 row in each cell, ovate-oblong, somewhat angled, smooth.

Canescent and more or less villous, 6 dm. or less high; leaves lanceolate to linear-lanceolate, acuminate, mostly denticulate, 3-8 cm. long, the floral shorter and broader; flowers in a close terminal spike or several short lateral spikelets; capsule smooth or slightly villous, 4-8 mm. long 1. *B. densiflora.*

Glabrous or slightly pubescent, slender, 3 dm. or less high; leaves ovate to oblong-lanceolate, acute, serrate, 10-25 mm. long, the floral scarcely smaller; flowers in a simple spike,, shorter than the leaves; petals deep purple, less than 2 mm. long....... 2. *B. glabella.*

1. **B. densiflora** Wats. Occasional in meadows in the Transition Zone, San Bernardino Mts.

2. **B. glabella** Walp. Low ground. Santa Monica to San Diego.

6. CLARKIA.

Erect, sparingly branched annuals with alternate, mostly petiolate leaves and racemose or spicate flowers, nodding in the bud; calyx-tube obconic above the ovary, deciduous, its 4-cleft limb reflexed; petals 4, clawed, lobed or entire; stamens 8, those opposite the petals sometimes sterile or wanting; anthers oblong or linear, basifixed; ovary 4-celled; style elongated; stigma 4-lobed, the lobes at length spreading; capsule linear, attenuate above, erect, somewhat 4-angled, 4-celled, 4-valved to the middle; seeds numerous, angled or margined.

Petals 2-lobed, with a subulate tooth in the sinus; claw short and broad, not hairy or appendaged at the base. .... 1. *C. Xantiana.*
Petals entire, rhomboidal; filaments with hairy scales at each side of the base.
  Claw long and slender, without teeth; capsule sessile .... 2. *C. elegans.*
  Claw short and broad, often broadly toothed; capsule pedicellate .... 3. *C. rhomboidea.*

1. **C. Xantiana** Gray. Rare. Fort Tejon, the type station, *Xantus;* Bluff Lake, San Bernardino Mts., *Miss Hutchinson,* acc. to *Parish.*

2. **C. elegans** Dougl. Frequent in the Chaparral Zone.

3. **C. rhomboidea** Dougl. Frequent in the Upper Chaparral and Lower Transition Zones.

7. GODETIA.

Erect simple or branched annuals with alternate entire or denticulate leaves and showy flowers in usually leafy racemes or spikes; calyx-tube obconic or funnelform, deciduous; petals 4, broad, sessile, entire, emarginate or lobed; stamens 8, those opposite the petals shorter, the anthers basifixed, erect or arcuate; capsule linear, rarely ovate, 4-sided, somewhat coriaceous, loculicidally dehiscent; seeds in 1 or 2 rows, obliquely angled, the edge margined.

Flowers erect in the bud.
  Stigma lobes short-oblong; petals 6-12 mm. long, purplish, often with a dark spot at the summit; herbage puberulent .... 1. *G. quadrivulnera.*
  Stigma lobes linear-oblong; petals 12-18 mm. long, purple; herbage glabrous............... 2. *G. viminea.*
Flowers nodding in the bud.
  Petals purplish or rose-color.
    Petals clawless .... 3. *G. bottae.*
    Petals short-clawed .... 4. *G. dudleyana.*

Petals cream-color, rounded with an acute point at the apex; leaves linear to linear-lanceolate; stigma-lobes short; capsule short-pedicellate .... 5. *G. epilobioides.*

Petals pink, abruptly rounded, tapering to base, becoming narrow and claw-like; stigma-lobes broadly obovate, 1.5 mm. long; capsule sessile .... 3. *G. delicata.*

1. **G. quadrivulnera** Spach. Common on dry hillsides and in open places in the chaparral belt.

2. **G. viminea** Spach. Occasional in open grassy places in the foothills.

3. **G. bottae** Spach. Santa Monica Mts. and the hills about Los Angeles, and in the lower chaparral belt of the mountains.

4. **G. dudleyana** Abrams. Frequent in the upper part of the chaparral belt of the San Gabriel Mts.

5. **G. epilobioides** (Nutt.) Wats. Common in the chaparral belt; Catalina Island. First collected at San Diego by *Nuttall.*

6. **G. delicata** Abrams. Frequent on shady slopes between Potrero and Campo, San Diego Co., acc. to *Abrams.*

8. OENOTHERA.

Annual or biennial herbs with mostly erect branching stems; leaves alternate, sessile or short-petioled, undulate-toothed or entire; flowers large, yellow, nocturnal, in terminal spikes; calyx-tube elongated, terete, gradually enlarged at the throat, with narrow segments and the tips free in the bud; petals 4, spreading; stamens many, equal in length, the filaments filliform; anthers linear; ovary 4-celled; seeds horizontal, prismatic-angled, in 2 or more rows in each cell.

1. **O. hookeri** T. & G. Frequent in moist ground, along streams in the valleys and mountains.

9. ANOGRA.

Low, spreading herbs, somewhat woody at base, often with papery exfoliating bark; leaves simple, alternate, more or less sinuate toothed; flowers drooping in the bud, showy, white or pink, usually axillary, diurnal; calyx-tube elongated, enlarging upward, the lobes narrow, becoming reflexed; stamens 8, equal in length, the filaments filiform; anthers linear; style filiform; stigma 4-cleft; ovary elongated; capsules sessile, often woody, 4-celled; seeds in a single row in each cell.

Stems herbaceous from a perennial running rootstock.

Leaves linear to oblong-lanceolate, sessile or short-petioled, entire to sinuate-pinnatifid; tips of the calyx-lobes free in the bud; petals entire or emarginate; seeds narrowly oblong, terete.................... 1. *A. palida.*

Hoary pubescent and more or less villous; leaves narrowly oblanceolate, acuminate, petioled, sinuately toothed or pinnatifid; petals lobed with a rounded sinus; ovary and calyx villous; seeds oblong, somewhat obtusely angled.................. 2. *A. californica.*

Stems erect from an annual root; glabrous or somewhat villous; calyx very villous, the tips of the lobes not free in the bud; petals large with a deep sinus; capsule thickened toward the base; seeds ovate-oblong; compressed .... 3. *A. trichocalyx.*

1. **A. palida** Britton. Occasional on the desert slopes of the mountains.

2. **A. californica** Small. Occasional in sandy soil near Santa Ana, *Geis;* Cucamonga, *Abrams;* Castaic Canyon; Mohave Desert.

3. **A. trichocalyx** Small. Occasional in the Mohave and Colorado Deserts.

11. TARAXIA.

Acaulescent perennial herbs with a short caudex; leaves crowded at the base, pinnatifid or entire; flowers perfect, regular, axillary; calyx-tube prolonged beyond the ovary into a slender cylindric tube; petals 4, yellow or white; stamens 8; stigma capitate, entire or 4-toothed; capsule sessile, oblong, 4-winged; seeds in a double row in each cell of the ovary.

1. **T. palmeri** Small. Occasional on the Mohave desert.

12. CHYLISMIA.

Caulescent annuals with pinnatifid leaves and flowers in terminal racemes; calyx-tube obconic or funnelform, produced beyond the ovary; sepals 4, reflexed; petals 4, entire, yellow or ochroleucous, sometimes turning rose-color or purplish; stamens 8; anthers oblong, attached by the middle; stigma capitate, entire; capsule glabrous, clavate, pedicelled; seeds in a single row in each cell.

1. **C. scapoidea** Nutt. Mohave and Colorado Deserts. Between Whitewater and Indio.

Var. *aurantica* Wats. Inflorescence puberulent; calyx-tube tinged with orange; petals orange or rose-color; capsule puberulent. Southeastern California, acc. to *Bot. Cal.*

10. PACHYLOPHUS.

Caespitose, almost acaulescent herbaceous perennials with rosettes of narrowly oblanceolate, entire or pinnatifid, acute leaves and large white flowers having long calyx tubes; capsules basal, woody, doubly crested on the angles.

1. **P. caespitosus** Raimann. Rare. Cushenberry Canyon, in the Pinyon Zone, *Parish*.

13. EULOBUS.

A smooth, erect annual with alternate leaves and medium-sized flowers, sessile along the virgate branches; calyx-tube scarcely produced above the ovary, the limb 4-parted, reflexed; petals 4 rhombic-ovate, sessile, pale yellow turning reddish; capsule linear, 4-angled, reflexed; seeds numerous, ovate-oblong, naked.

1. **E. californicus** Nutt. Frequent in the Chaparral Belt.

14. SPHAEROSTIGMA.

Annual or perennial herbs with usually shining and exfoliating bark, alternate entire or dentate leaves and flowers axillary or in spikes; corolla yellow, white or rose, frequently becoming reddish in age; stamens 8; stigma capitate; fruit a linear, usually angled, often contorted capsule.

Flowers red.
  Plant stiff, spicate; pods crowded, clavate........ 1. *S. rutila.*
  Plant slender, paniculate; pods narrow, linear..... 2. *S. erythra.*
Flowers white or rose-colored.
  Plant glabrous in age; capsule attenuate from the base .... 3. *S. gauraeflora.*
  Plant puberulent; capsule not attenuate from the base .... 4. *S. alyssoides.*
Flowers axillary, yellow.
  Perennials.
    Leaves silvery-canescent, sessile................. 5. *S. viridescens.*
    Leaves hirsute-canescent, not silvery, lowest leaves short-petioled .... 6. *S. spirale.*
  Annuals.
    Capsule more or less contorted or coiled.
      Petals 8-10 mm. long.
        Capsule not attenuate into a beak.......... 7. *S. bistortum.*
        Capsule attenuate to a short beak..........
          Leaves undulate-crisped, hirsute........... 8. *S. Veitchianum.*
          Leaves with a few remote, small teeth, not undulate, nearly glabrous.............. 9. *S. Hallii.*

Petals 5 mm. long or less.
  Lower stem leaves ovate. hirsute............10. *S. micranthum.*
  Lower stem leaves oblanceolate, finely pubescent ....11. *S. pallidum.*
  Lower stem leaves ovate, short hirsute, upper leaves adpressed to the stem...........12. *S. hirtellum.*
Capsule not contorted.
  Petals 3 mm. long...............................13. *S. contortum.*
  Petals 8-10 mm. long...........................14. *S. campestre.*

1. **S. rutila** Davidson. Locally abundant at Big Rock Creek, (type locality) and Swarthout Canyon. June-July.

2. **S. erythra** Davidson. Palm Springs, *Macbride.*

3. **S. gauraeflora** T&G. Common on the Colorado and Mohave Deserts. May.

4. **S. alyssoides** Small. Echo Mt.; Santa Paula and Sespe Creek, *Abrams.*

5. **S. viridescens** Walp. Very common along the seashore and flowering nearly continuously.

6. **S. spirale** Walp. With the last but much less common.

7. **S. bistortum** Walp. Common at San Diego; rare in Los Angeles Co.

8. **S. Veitchianum** Small. Very common, especially near the coast. April-June.

9. **S. Hallii** Davidson. Banning; Tahquitz Canyon; Coyote Canyon, Colorado Desert.

10. **S. micranthum** (Hornm.) Walp. Very common near the coast, less so in the interior valleys. April-May.

11. **S. pallidum** Abrams. Colorado Desert; Palm Springs and Coachella. May.

12. **S. hirtellum** Small. Las Tunas Canyon, Santa Monica; Arroyo Seco.

Var. *montanum* Davidson. Plant less hirsute and petals usually lacerate. The common form on all our southern mountains. May-June.

13. **S. contortum** Walp. *(O. strigulosa.)* Common in sandy soil on the plains.

Var. *Greenei* Small. Plant more hirsute and somewhat viscid. The common form of the interior valleys and mountains.

14. **S. campestre** Small. *(O. dentata.)* Common on the interior mountains and deserts. June.

Var. *Parishii* Abrams. Plant pubescent, not at all hirsute, and pods often much contorted. Plains about San Bernardino, *Abrams.*

15. GAYOPHYTUM.

Erect, very slender diffusely branched annuals, with alternate linear entire leaves and axillary white or purplish flowers; calyx-tube not produced beyond the ovary, the 4-parted deciduous limb reflexed; petals 4; stamens 8, the alternate ones usually minute and sterile; filaments filiform; anthers subglobose, fixed near the middle; ovary oblong or linear, compressed, 2-celled; stigma capitate or clavate; capsule membranous, 4-valved; seeds in 1 row in each cell, naked, oblong.

- Seeds canescent with appressed hairs; flowers small, the petals about 1 mm. long............ 1. *G. lasiospermum.*
- Seeds glabrous.
  - Plant intricately dichotomous; flowers small; capsules subclavate, often tortulose; seeds erect, papillate .... 2. *G. ramosissimum.*
  - Plant subsimple or paniculately branched, leafy.
    - Capsules narrowly linear, erect, subsessile; seeds smooth, erect .... 3. *G. caesium.*
    - Capsules broadly oblong, flattened contrary to the septum; seeds very oblique.............. 4. *G. pumilum.*

1. **G. lasiospermum** Greene. Open pine forests in somewhat dry situations. North Baldy; San Jacinto Mts.; both acc. to *Abrams.* Mt. San Antonio, *Johnston.*

2. **G. ramosissimum** T. & G. Common in the lower Transition Zone of all our mountains.

3. **G. caesium** T. & G. Upper Transition Zone on the north side of the San Antonio Mts., *Johnston.*

4. **G. pumilum** Wats. Occasional in dry meadows in the Lower Transition Zone. San Bernardino Mts., *Parish;* San Jacinto Mts., *Hall.*

16. GAURA.

Annual, biennial or perennial herbs with alternate, mostly narrow and small leaves, and small, red or pink flowers in terminal sometimes elongated racemes; calyx-tube prolonged beyond the ovary into a slender but short tube; sepals 4; petals 4, clawed and unequal; stamens usually 8, declined; ovary 4-celled; style declined; stigma 4-lobed surrounded by a cup-like border; fruit nut-like ribbed or angled, indehiscent.

1. **G. parviflora** Dougl. Fort Mohave, Cooper, acc. to Bot. Cal.

17. HETEROGAURA.

A smooth or puberulent annual with lanceolate, entire, petiolate leaves and purplish flowers; calyx-tube short-obconic above the small ovary, its limb 4-cleft, spreading, deciduous; petals 4, entire, clawed; stamens 8, unequal, those opposite the petals shorter and sterile; fertile anthers ovate-cordate, attached by the base and not versatile; ovary 4-celled; style long; stigma discoid, entire; fruit nut-like, obovoid, indehiscent.

1. **H. californica** Rothr. Frequent on shady banks in the Lower Transition Zone. San Bernardino Mts.

18. CIRCAEA.

Low, weak, glabrous herbs with opposite petiolate leaves and small, white, reddish tinged flowers in racemes; calyx-tube slightly prolonged beyond the ovary; sepals, petals and stamens 2; fruit 1- or 2-seeded, indehiscent, usually covered with hooked hairs.

1. **C. pacifica** Asch & Magn. Occasional in damp thickets in the Lower Transition Zone, San Bernardino Mts., *Parish.*

ORDER UMBELLALES.

Herbs; flowers in umbels.
Fruit dry .... 1. Apiaceae.
Fruit berry-like .... 2. Araliaceae.
Shrubs; fruit drupaceous or baccate................ 3. Cornaceae.

1. APIACEAE. Parsley Family.

Annual, biennial or perennial herbs with mostly hollow stems, leaves usually alternate, often all basal, variously compound, rarely simple; petioles expanded or sheathing at base, flowers small, in umbels (in one genus in heads); umbels usually compound; bracts forming involucres and involucels or sometimes wanting; calyx represented by 5 teeth or wanting; petals and stamens 5; ovary inferior, the two filiform styles often borne on a stylopodium; fruit of 2 carpels, ribbed or winged, the wings sometimes corky-thickened; oil tubes present in the carpel walls in most species. *(Umbelliferae.)*

Flowers in dense heads............................ 4. Eryngium.
Flowers umbellate.
Fruit conspicuously bristly.
Bristles not hooked............................ 5. Washingtonia.
Bristles hooked or barbed at the tip.
Fruit wholly covered with hooked bristles..... 3. Sanicula.
Fruit with bristles only on the ribs.
Bristles barbed at the tip.................. 25. Daucus.
Bristles not barbed at the tip.............. 6. Caucalis.
Fruit not bristly.
Fruit more or less flattened laterally.
Leaves orbicular or peltate.................... 1. Hydrocotyle.
Leaves opposite, simple or lobed.............. 2. Bowlesia.
Leaves large, decompound; stem spotted....... 8. Conium.

- Fruit strongly flattened dorsally with lateral ribs winged.
  - Oil tubes solitary in the intervals.
    - Stylopodium conical; flowers white.
      - Leaves 1 or 2 pinnate; flowers tomentose, sessile ....18. Sphenosciadium.
      - Leaves large, ternately compound.........24. Heracleum.
    - Stylopodium flat or wanting.
      - Caulescent and branching.
        - Flowers white.
          - Leaves pinnately dissected, leaflets linear; plant slender ....27. Anethum.
          - Leaves ternately or pinnately compound, leaflets large, ovate................19. Angelica.
        - Flowers yellow; leaflets large.............23. Pastinaca.
    - Stylopodium wanting (oil tubes more than one in some species).
      - Acaulescent, or nearly so.
        - Leaflets narrow or small..................21. Cogswellia.
        - Leaflets large, ovate, serrate (E. insularis excepted) ....22. Eury-yptera.
  - Oil tubes more than one in the intervals.
    - Leaves pinnately decompound; fruit large, wings thick ....20. Leptotaenia.
- Fruit usually more or less laterally flattened.
  - Oil tube solitary in the intervals.
    - Stylopodium conical.
      - Leaflets filiform.
        - Flowers white ....26. Coriandrum.
        - Flowers yellow ....17. Foeniculum.
      - Leaflets linear, few ....13. Carum.
      - Leaflets large, lanceolate, serrate.............12. Cicuta.
    - Stylopodium flat or wanting; flowers white.
      - Plants stout, leaflets coarse.
        - Lateral ribs thick, dorsal ones filiform......16. Oenanthe.
        - All ribs thick and broad..................11. Apium.
      - Plant slender, leaflets filiform; ribs obscure.... 7. Apiastrum.
  - Oil tubes more than one in the intervals.
    - Stylopodium conical.
      - Fruit round, ribs inconspicuous; plant aquatic. 15. Berula.
      - Fruit ovate, ribs filiform; dry ground plants...14. Eulophus.
    - Stylopodium flat or wanting; fruit terete.
      - Leaves pinnate, leaflets large................ 9. Deweya.
      - Leaves ternately compound, leaflets small......10. Drudeophytum.

1. HYDROCOTYLE. Water Pennywort.

Low, slender aquatic perennials with creeping stems, peltate-orbicular or reniform leaves and white flowers in simple or proliferous umbels without involucres; fruit orbicular flattened laterally.

Leaves orbicular-peltate, margins crenate.
Fruit notched at base and apex; peduncles longer than the leaves.
Pedicels 4-12 mm. long; umbels simple.......... 1. *H. umbellata.*
Fruit cuneate, tapering to the pedicel, not notched.
Pedicels very short; umbels proliferous.......... 2. *H. cuneata.*
Leaves round reniform, 3-5-cleft with crenate lobes; peduncles about 2.5 cm. long, reflexed in fruit; pedicels 1 mm. long............ 3. *H. ranunculoides.*

1. **H. umbellata** L. Borders of streams and marshes from San Bernardino to San Diego. June.

2. **H. cuneata** C. & R. Colorado Desert; Santa Barbara. *C. & R.* April-May.

3. **H. ranunculoides** L. Frequent in slow streams. June-July.

2. BOWLESIA.

Slender annuals with trailing stems, opposite 5-lobed or heart shaped leaves and few flowered umbels of white flowers on axillary peduncles; fruit flattened dorsally.

1. **B. septenrionalis** C. & R. (B. lobata R. & P.) Common and widely distributed in shady places. April-May.

3. SANICULA. Snake-root.

Erect perennials with mostly palmate leaves and yellow or purple flowers on nearly leafless smooth stems; fruit subglobose, densely covered with hooked bristles; involucres and involucels present.

Mature fruit pediceled.
Leaves round-cordate, deeply 3-5-lobed, lobes toothed, teeth bristle tipped; fruit bristly all over...................... 1. *S. Menziesii.*
Leaves palmately 5-parted, the divisions pinnately lobed, toothed, decurrent upon the rachis; fruit less bristly below.......... 2. *S. arguta.*
Mature fruit not pediceled.
Leaves palmately divided.
Leaves with basal lobes confluent............... 3. *S. laciniata.*
Leaves with basal lobes distinct................. 4. *S. nevadensis.*
Leaves more or less pinnately divided.
Leaves with winged and toothed rachis; flowers purple .... 5. *S. bipinnatifida.*
Leaves without winged rachis.................. 6. *S. bipinnata.*
Leaves with very fine subdivisions; roots tuberous 7. *S. tuberosa.*

1. **S. Menziesii** H. & A. Frequent in the shade of foothill groves. April-May.

2. **S. arguta** Greene. Not uncommon on grassy hillsides. April-May.

3. **S. laciniata** H. & A. With the last but less common.

4. **S. nevadensis** Wats. In and below the pine belt in all the mountains. May-June.

5. **S. bipinnatifida** Dougl. On grassy slopes throughout our region.

6. **S. bipinnata** H. & A. Santa Barbara; San Fernando Valley, *Abrams.*

7. **S. tuberosa** Torr. On dry banks in the chaparral belt, in some places abundant. April-June.

4. ERYNGIUM. Button Snakeroot.

Ours a low branching perennial with simple or pinnate leaves, lacinate-toothed or cleft, petioles spinosely toothed; flowers short peduncled with slightly spinose bracts, longer than the heads; fruit ovoid, flattened laterally and covered with hyaline scales.

1. **E. Parishii** C. & R. Sandy ground, Redondo; San Diego Co., Oceanside, type locality. June.

5. WASHINGTONIA. Sweet Cicely.

Glabrous pubescent slender perennials, 3-9 dm. high with ternately compound leaves and white flowers; rays few and umbels with few fruits; stylopodium conical; fruit linear, attenuate at base and bristly along the ribs; carpels pentagonal on section; oil tubes none.

Involucels of linear bracts; pedicels 1-2 mm. long; leaflets deeply lobed.................. 1. *W. brachypoda.*
Involucels none; leaflets usually 3-lobed and dentate-serrate.
  Pedicels about 2.5 cm. long, longer than the fruit 2. *W. nuda.*
  Pedicels 4-12 mm. long, shorter than the fruit... 3. *W. brevipes.*

1. **W. brachypoda** Heller. Not common but generally distributed in shady canyons. May-June.

2. **W. nuda** Heller. San Bernardino Mts.; base of Mt. Tahquitz. July-August.

3. **W. brevipes** C. & R. Cuyamaca Mts., at 1,380 meters.

6. CAUCALIS.

Hispid annuals with compound leaves pinnately dissected into very small segments and white flowers in simple umbels; fruit oblong, flattened laterally, the 5 primary ribs bristly, the 4 secondary with barbed hooks or prickles.

Umbels opposite the leaves; peduncles 2-4 mm. long. 1. *C. nodosa.*
Umbels terminal, 2.5-5 cm. long.................. 2. *C. microcarpa.*

1. **C. nodosa** Scop. (Torilis nodosa Gaertn.) Bluffs near San Pedro Lighthouse; Oak Knoll, Pasadena. 1894. May.

2. **C. microcarpa** H. & A. Coastal foothills from Los Angeles to San Diego, not common. April-May.

7. APIASTRUM.

Low glabrous leafy branched annual, the compound leaves finely dissected into linear segments and small white flowers in naked umbels; fruit ovate or cordate, laterally compressed, ribs obscure.

1. **A. angustifolium** Nutt. Common in sandy soils in the valleys and foothills. May.

8. CONIUM. Poison Hemlock.

Tall glabrous herbs with spotted stems, dissected decompound leaves and small white flowers in compound umbels; involucres and involucels small; fruit broadly ovate, somewhat flattened laterally; ribs prominent.

1. **C. maculatum** L. Occasional in shady or moist ground. Los Angeles, 1893.

9. DEWEYA.

Tall glabrous perennial with simply pinnate, mostly basal leaves, leaflets ovate, finely mucronate serrate; involucres none; involucels of few linear bractlets; flowers yellow; fruit oblong, slightly flattened laterally; oil tubes numerous.

1. **D. arguta** T. & G. Dry hills from San Bernardino Co. to San Diego. May-June.

10. DRUDEOPHYTUM.

Caulescent perennials with ternately or pinnately compound leaves, differentiated from *Deweya* by the subglobular fruit with filiform ribs.

Foliage glabrous; leaves ternately compound, leaflets irregular and acutely toothed; fruits pedicelled .... 1. *D. Parishii*
Foliage pubescent with long hairs; leaves pinnately compound; fruits subsessile .... 2. *D. vestitum.*

1. **D. Parishii** C. & R. Common in the San Bernardino Mts., the type locality; less frequent in the San Jacinto and San Gabriel Mts. Alt. 1,500-1,800 meters. June-July.

2. **D. vestitum** C. & R. Mt. Baldy, type locality; occasional in Bear Valley, *Parish*. July.

11. APIUM.

Glabrous erect perennials with pinnately divided leaves and compound umbels of white flowers; involucres and involucels small or none; fruit ovate; flattened laterally, broader than long; ribs prominent, obtuse.

1. **A. graveolens** L. Common Celery. Well established in marshy ground.

12. CICUTA. Water Hemlock.

Tall, smooth, poisonous water perennial with large leaves twice pinnate, the leaflets sharply serrate, conspicuously reticulate beneath; flowers white; involucre of small bractlets; fruit oblong, flattened laterally, 3 mm. long, lateral ribs larger.

1. **C. occidentalis** Greene. Not uncommon in marshes in Los Angeles and San Bernardino Co's. July-August.

13. CARUM.

Smooth erect plants with leaves pinnate and leaflets linear (except in *C. carui*) and white flowers; fruit flattened laterally, oblong, ribs inconspicuous, stylopodium conical.

Leaves pinnately compound with narrow entire or toothed divisions .... 1. *C. carui.*
Leaves simply pinnate, segments linear.
  Fruit broadly ovate, nearly orbicular, 1-2 mm. long. 2. *C. Gairdneri.*
  Fruit oblong, tapering at the ends, 3 mm. long... 3. *C. Lemmoni.*

1. **C. carui** L. Common Caraway. An occasional escape near cultivated fields.

2. **C. Gairdneri** Gray. Cienega near Ballona; San Diego Co. August.

3. **C. Lemmoni** C. & R. Near Ivy Station, Los Angeles. August.

14. EULOPHUS.

Glabrous perennials with pinnately or ternately compound leaves, linear leaflets and white flowers; involucres and involucels of lanceolate bracts; fruit ovate or oblong, flattened laterally; stylopodium conical; styles recurved.

Leaves ternate; plant slender....................... 1. *E. Parishii.*
Leaves pinnate, petioles and rachis inflated; plant stout .... 2. *E. Pringlei.*

1. **E. Parishii** C. & R. Common in Bear Valley, type locality; San Jacinto and Cuyamaca Mts. July-August.

2. **E. Pringlei** C. & R. Desert slopes of the San Gabriel and San Antonio Mts. May.

15. BERULA.

Aquatic perennial with simple pinnate leaves, serrate or incised leaflets and white flowers; involucre and involucels of long, narrow bracts; fruit laterally flattened, nearly round, glabrous; stylopodium conical.

1. **B. erecta** Cov. Occasional along water courses in Los Angeles Co. July.

16. OENANTHE.

Coarse aquatic herbs with pinnate leaves, ovate toothed and lobed leaflets and white flowers; involucre and involucels bracted; fruit globose, ribs broad; stylopodium very short.

1. **O. sarmentosa californica** C. & R. In slow streams in probably all the southern counties. June-July.

17. FOENICULUM. Fennel.

Perennial glabrous herb with pinnate compound leaves, the segments linear or capillary, and yellow flowers destitute of involucres; fruit linear-oblong, terete or nearly so, ribs prominent.

1. **F. foeniculum** Karst. Abundant on waste grounds, Los Angeles, 1898.

18. SPHENOSCIADIUM.

Stout perennial the pinnate or bipinnate leaves with linear lanceolate, lobed segments, dilated petioles and white tomentose flowers in dense globose heads; involucre of linear bracts; fruit flattened dorsally, cuneate-obovate, strongly ribbed at base, winged above. *(Selinum.)*

1. **S. eryngifolium** C. & R. Frequent on the borders of cienegas in the San Bernardino and San Jacinto Mts.; desert slope of the San Antonio Mts. July-August.

19. ANGELICA.

Ours, a stout perennial with leaves ternate then pinnate, leaflets ovate, hoary pubescent, irregularly serrate and white flowers; involucels small or none; fruit strongly compressed, elliptic in outline, lateral ribs broadly winged.

1. **A. tomentosa** Wats. Frequent on the borders of the pine belt in the San Bernardino and San Jacinto Mts.; Brown's Flat, San Antonio Mts., *Johnston.*

20. LEPTOTAENIA.

Stout perennials with pinnately decompound leaves and yellow flowers; involucels of few bracts or none; fruit flattened dorsally, the oblong-elliptic lateral wings very thick and corky, ribs obscure.

Foliage puberulent, leaves finely dissected; involucels present .... 1. *L. multifida.*
Foliage glabrous, leaflets lobed and coarsely toothed; involucels none .... 2. *L. californica.*

1. **L. multifida** Nutt. San Bernardino Mts., in the Chaparral Zone; hills near Manzana. Frequent in the Tehachapi Mts. May-June.

2. **L. californica** Nutt. Santa Barbara, type locality; frequent in the Tehachapi Mts.

21. COGSWELLIA.

Low dry-ground perennials with thick roots, ternate to dissected leaves and yellow, white or purple flowers, without involucres; involucels mostly present; fruit strongly flattened dorsally, oblong to orbicular, lateral ribs winged. *(Peucedanum.)*

Bracts of involucel conspicuous.
  Flowers yellow; bractlets obovate.
    Fruit 4-10 mm. long.......................... 1. *C. utriculatum.*
    Fruit 12-14 mm. long......................... 2. *C. Vaseyi.*
  Flowers white; bractlets not obovate.
    Fruit pubescent; leaf segments linear........... 3. *C. dasycarpum.*
    Fruit densely tomentose; leaf segments filiform.. 4. *C. tomentosum.*
Bracts of involucel small or wanting.
  Fruit pubescent, orbicular, intermediate ribs prominent .... 5. *C. mohavense.*
  Fruit glabrous, orbicular, ribs nearly obsolete...... 6. *C. Parishii.*

1. **C. utriculatum** Jones. Common on mesas and grassy foothills. May.

2. **C. Vaseyi** C. & R. Dry mesas near Colton. May.

3. **C. dasycarpum** Jones. Foothills from Los Angeles Co., to San Diego, not common.

4. **C. tomentosum** Jones. Hills north of Pomona.

5. **C. mohavense** C. & R. Mohave Desert north from Lancaster to Inyo Co., Yucca, type locality; Morongo Pass, *Parish;* S. E. of Mt. San Jacinto, *Hall.* May-June.

6. **C. Parishii** C. & R. Common in Bear Valley, type locality; southern borders of the Mohave Desert. May.

22. EURYPTERA.

Glabrous perennials with compound leaves, the leaflets broad, sharply toothed or much dissected, and yellow flowers; involucels present; fruit strongly flattened dorsally, orbicular or oblong, lateral ribs broadly winged.

Involucre absent.
  Leaves ternate or biternate: leaflets toothed more than 2 cm. broad.
    Involucels longer than the pedicels; base of leaflets cuneate .... 1. *E. Hassei.*
    Involucels shorter than the pedicels; leaflets cordate .... 2. *E. lucida.*
Involucre of a single bract.
  Leaves compound, much dissected.................. 3. *E. insularis.*

1. **E. Hassei** C. & R. Laurel and Santa Monica Canyons; Sierra Madre Canyon, type locality. May.

2. **E. lucida** Nutt. On dry banks in the chaparral belt from San Bernardino Co. to San Diego. May.

3. **E. insularis** C. & R. San Nicholas Island, only locality. April.

23. PASTINACA. Parsnip.

Tall branching biennial with angular stems, pinnate leaves, large ovate serrate leaflets and yellow flowers in compound umbels; fruit oval, glabrous, much flattened dorsally, lateral ribs winged.

1. **P. sativa** L. Established in marshes. San Bernardino, 1882.

24. HERACLEUM.

Tall stout perennial with large ternately compound leaves, deciduous involucres, involucels of numerous bractlets and white flowers and obcordate petals; fruit broadly ovate, much flattened dorsally.

1. **H. lanatum** Michx. Frequent on the border of the pine belt, San Bernardino and San Jacinto Mts. June-July.

25. DAUCUS.

Bristly annuals or biennials with pinnately decompound leaves, foliaceous and cleft involucral bracts, entire or toothed bractlets and white flowers; fruit oblong, ribs with barbed prickles.

Rays less than 2 cm. long; involucres divided into linear segments .... 1. *D. pusillus.*
Rays more than 2 cm. long; involucres divided into filiform segments .... 2. *D. carota.*

1. **D. pusillus** Michx. Rattlesnake Weed. Frequent on dry hills in the chaparral belt.

2. **D. carota** L. Wild Carrot. A garden escape, locally established. Los Angeles, 1892.

26. CORIANDRUM. Coriander.

Slender glabrous annual with pinnately dissected leaves and compound umbels of white flowers; involucres none, involucels few-parted; fruit nearly globose, the ribs filiform.

1. **C. sativum** L. Occasional in city wastes. Los Angeles, 1888.

27. ANETHUM. Anise.

Glabrous aromatic herb with fennel-like leaves and white flowers; fruit compressed dorsally, lateral wings narrow.

1. **A. graveolens** L. An occasional garden escape. Los Angeles, 1889.

2. ARALIACEAE. Ginseng Family.

Like *Apiaceae* but the umbels not regularly compound; stems solid; petals imbricated in the bud; styles and carpels more than 2; fruit fleshy.

1. ARALIA. California Spikenard. Ginseng.

Perennial herb with alternate compound leaves and whitish flowers in loose umbels; pedicels jointed; calyx 5-toothed or entire; petals 5, ovate; stamens 5; ovary 2-5-celled; fruit a globular black berry.

1. **A. californica** Wats. Frequent along mountain streams at middle altitudes.

3. CORNACEAE. Dogwood Family.

Trees or shrubs with simple, entire, mainly opposite, exstipulate leaves and perfect or unisexual flowers in spikes or cymes; calyx lobes minute; petals and stamens 4, epigynous; ovary inferior, becoming a 1- or 2-seeded drupe or berry, sometimes dry at maturity.

Leaves evergreen; petals none.
  Flowers in aments.......................... 1. Garrya.
Leaves deciduous; petals 4.
  Flowers not in aments.
    Flowers greenish, capitate, subtended by a large, white involucre .... 2. Cynoxylon.
    Flowers white, cymose, not subtended by an involucre .... 3. Svida.

1. GARRYA. SILK-TASSEL BUSH.

Medium sized shrubs with opposite, elliptical, ovate, short petioled, coriaceous, evergreen leaves and dioecious flowers in axillary spikes; petals none; calyx 4-merous in the staminate flowers, with 4 stamens, 2-lobed or obsolete in the pistillate flowers; ovary 1-celled, styles 2, persistent; fruit an ovoid berry.

Pubescence on lower surface of the leaves of matted hairs .... 1. *G. Veatchii.*

Pubescence on lower surface of the leaves of upwardly adpressed hairs................ 2. *G. pallida.*

1. **G. Veatchii Palmeri** Eastw. Not uncommon at middle altitudes in all our mountains.

Var. *undulata* Eastw. Leaf margins undulate; calyx teeth some distance below the base of the styles. Occasional on Mts. Wilson and Lowe. *Abrams.*

2. **G. pallida** Eastw. Santiago Peak; Topa Topa and Cuyamaca Mts., *Abrams.*

2. CYNOXYLON. FLOWERING DOGWOOD.

A shrub or small tree with large obovate, entire leaves and flowers in a close head surrounded by a conspicuous involucre of 4-6 white, petal-like bracts; stamens 4; fruit oblong, red. *(Cornus.)*

1. **C. Nuttallii** Audb. Frequent in the pine belt of the San Bernardino Mts. June-July.

3. SVIDA. DOGWOOD.

Differs from the last in having white flowers in a round-topped cyme and no petaloid involucre; fruit slightly fleshy, subglobose, white. *(Cornus.)*

1. **S. californica** C. A. Mey. Occasional along stream banks in the San Gabriel and Cuyamaca Mts.; more frequent in the San Bernardino and San Jacinto ranges; the few trees formerly growing in the cienega near Los Angeles have been destroyed. June.

ORDER ERICALES.

Herbaceous saprophytes without green leaves.
  Flowers 4-5-merous............................ 1. MONOTROPACEAE.
  Flowers 5-10-merous .... 2. LENNOACEAE.

Herbs or shrubs with green leaves.
  Corolla of essentially distinct petals; herbs........ 3. PYROLACEAE.
  Corolla of more or less united petals; shrubs..... 4. ERICACEAE.

1. MONOTROPACEAE. Indian Pipe Family.

Fleshy herbs with variously colored stems destitute of chlorophyll, parasitic or saprophytic; stems usually simple; flowers racemose, calyx of 2-6 distinct sepals; petals 3-6, sometimes partly united; stamens 6-12; anthers 2-celled opening by valves or pores, sometimes appendaged; fruit a globular or ovoid capsule, 4-6-celled or 1-celled.

Corolla white, globular, ovate, the short lobes recurved; anthers 2-awned on the back... 1. Pterospora.
Corolla red, campanulate, the lobes erect; anthers unappendaged .... 2. Sarcodes.

1. PTEROSPORA. Pinedrops.

Stems tall 20-30 cm. high, chestnut-colored, solitary; leaves scale like; flowers in a long raceme; calyx deeply 5-parted; corolla urceolate, white; stamens 10; stigma 5-lobed; capsule depressed-globose, 5-lobed; seeds numerous and broadly winged at the apex.

1. **P. andromedea** Nutt. Frequent in the pine woods of the San Bernardino Mts., rarer in the San Jacinto Mts.; Kelly's Canyon, San Antonio Mts. at 2,400 m. Transition and Canadian Zones. June-July.

2. SARCODES. Snow Plant.

Plants stout, fleshy, 2-5 dm. tall, viscid-pubescent, bright red in color; leaves scale-like, fleshy, their margins glandular ciliate; sepals 5, slightly united; corolla cylindraceous-campanulate, 5-lobed, persistent; stamens 10 unappendaged; ovary 5-celled, 5-lobed; capsule spheroidal.

1. **S. sanguinea** Torr. Appears soon after the snow melts in the coniferous belt and may be found in fair abundance from 1,100 to 2,400 m. alt. June-July.

2. LENNOACEAE.

Fleshy parasitic plants destitute of chlorophyl with the aspect of *Orobanchaceae;* leaves reduced to scales; flowers perfect; sepals 5-10; corolla gamopetalous 5-8-lobed; stamens 5-10; the filaments adnate up to the throat of the tubular corolla; cells of the ovary doubled by false partitions, 1 ovule in each; fruit a drupaceous capsule.

Flowers spicate; sepals puberulent, shorter than the corolla .... 1. Pholisma.
Flowers on a dilated concave disk; sepals plumose, equalling the corolla .... 2. Ammobroma.

1. PHOLISMA.

Sepals 5 or 6, linear, puberulent, shorter than the corolla; corolla dark blue or purple, narrow funnel-form, plaited above into 6-7 white pleats; stamens as many as the lobes of the corolla, adnate to the tube in a single row; stigma 6-10-lobed; fruit 10-20-celled.

1. **P. arenarium** Nutt. Parasitic on the roots of various plants in the sands of the seashore and of the Mohave Desert, Santa Monica; San Diego; quite common at Haiwee on the Mohave Desert. May-July.

2. AMMOBROMA.

Stem expanded at the summit into a hollow receptacle which bears the flowers; sepals 6-10, filiform, plumose; corolla tubular with 6 plicate lobes; stamens 6-10, otherwise as in *Pholisma.*

1. **A. sonorae** Torr. Imperial Valley and the border of Lower California, parasitic on the roots of *Franseria* and *Prosopis.*

3. PYROLACEAE. WINTERGREEN FAMILY.

Low perennial herbs with simple petiolate leaves and perfect, solitary, racemose or corymbose flowers; sepals 5; petals 5, distinct or slightly united at base; stamens 10; anthers opening by pores or slits; style often declined; fruit a capsule.

Stems scapiform, leaves basal, flowers racemose...... 1. PYROLA.
Stems leafy, flowers corymbose..................... 2. CHIMAPHILA.

1. PYROLA. WINTERGREEN.

Low evergreen herbs; leaves when present basal; scape scaly-bracted; flowers in terminal racemes, nodding; petals orbicular, concave, white, greenish-white or reddish; filaments declined and curled up; style deflexed at base; stigma 5-lobed; valves of the capsule cobwebby when opening.

Leaves ovate, mottled.............................. 1. *P. picta.*
  Leaves obovate or oblanceolate, green............ 2. *P. dentata.*
  Leaves none or very rudimentary; flowers reddish 3. *P. aphylla.*

1. **P. picta** Smith. White-veined Shin-leaf. In shady pine woods at 2,000 m. alt. Bear Valley, San Bernardino Mts.; desert slope of the San Gabriel Mts. September.

2. **P. dentata** Smith. Icehouse Canyon, San Antonio Mts. at 2,400 m., *Johnston.* July.

3. **P. aphylla** Smith. Parasitic on plant roots in the Transition Zone; under pines in the San Bernardino Mts.; under live oaks in the Tehachapi Mts. July.

2. CHIMAPHILA. Pipsissewa.

Low perennial herbs with evergreen, rather large, shining, serrulate leaves in irregular whorls; flowers white, fragrant, in a terminal subumbel; filaments enlarged and hairy in the middle; stigma orbicular, crowning a short style immersed in the summit of the ovary.

1. **C. Menziesii** Spreng. Rare in the San Jacinto Mts., *Hall;* Mill Creek Falls and Snow Canyon San Bernardino Mts., *Parish;* frequent in the San Antonio and Cuyamaca Mts., *Abrams.*

4. ERICACEAE. Heath Family.

Shrubs or trees with scaly buds and simple alternate exstipulate leaves usually evergreen; flowers perfect, 4-7-merous; stamens 10, hypogynous; anthers 2-celled, opening by chinks or pores; fruit a berry drupe or capsule.

Fruit a capsule.
  Leaves large; corolla large, white, funnel-form. 1. Azalea.
  Leaves heath like; flowers small, rose-red....... 2. Phyllodoce.
Fruit a berry; ovary 5-celled, many ovuled; berry granular.......................... 3. Arbutus.
Fruit a drupe; ovary 5-10-celled, 1-ovuled.
  Drupe papillose, fleshy; leaves serrate.......... 4. Comarostaphylis.
  Drupe not fleshy, either solid or of separate nutlets.
    Bark grayish-brown; leaves revolute......... 5. Xylococcus.
    Bark reddish-brown; leaves thick, vertical.... 6. Arctostaphylos.

1. AZALEA. Western Azalea.

Shrubs with deciduous leaves, alternate, crowded on the ends of the branches; flowers large, ours white with a yellow spot on the upper lobe; stamens 5, exserted; capsule woody, elongated, septicidally 5-valved from the summit.

1. **A. californica** T. & G. Plentiful in Strawberry Valley, San Jacinto Mts.; Cuyamaca Mts. June.

2. PHYLLODOCE. Alpine Heather.

Dwarf evergreen with woody stems thickly beset with heath-like leaves; flowers rose purple in umbel-like clusters at the ends of the branches; corolla campanulate or rotate; stamens exserted, capsular globular. *(Bryanthus.)*

1. **P. Breweri** Heller. Top of Mt. San Gorgonio. August.

3. ARBUTUS. Madrono.

Shrubs or trees with exfoliating brownish-red bark; leaves alternate evergreen, leathery; flowers small, in a terminal panicle;

calyx small 5-lobed, corolla white, globular, 5-toothed; stamens 10, included; berry globular with a granular surface.

1. **A. Menziesii** Pursh. Rare and local in the San Gabriel Mts. at 900 m. alt. on Mt. Wilson and Sturtevant trails; near Barley Flats; Las Tunas Canyon, Santa Monica Mts. April.

4. COMAROSTAPHYLIS.

A shrub with the general characters of the Manzanita, but with leaves serrate, and margins revolute; fruit a globular fleshy drupe with a rough or warty surface, and nutlets united into a solid stone.

1. **C. diversifolia** Greene. Santa Cruz and Catalina Islands; San Diego Co., Jambul Valley the type locality; local in Topango Canyon, Los Angeles. April.

5. XYLOCOCCUS.

Shrub about 1 m. tall, leafy only at the end of the branches; leaves thin, entire, revolute, pinnately-veined; corolla rose-colored; nutlets united into a solid dry drupe.

1. **X. bicolor** Nutt. Foothills of San Diego Co. from Fallbrook southwards; San Diego the type locality. April.

6. ARCTOSTAPHYLOS. MANZANITA.

Small trees or shrubs with smooth, reddish-brown bark; leaves alternate, vertical; flowers 5-merous; corolla urceolate, white or rose colored; drupe with 4-10-stone-like 1-seeded nutlets, separable or united into a solid stone.

Drupe a solid stone.
  Fruit pulpless, pericarp thin...................... 1. *A. glauca.*
  Fruit with granular pulp.
    Young leaves canescent; fruit ribbed............ 2. *A. Parryana.*
    Petioles and pedicels glandular-villous.......... 3. *A. drupacea.*
Drupe of separable nutlets.
  Pedicels and ovaries glabrous.
    Leaves dull green; branchlets and inflorescence canescent.......................... 4. *A. pungens.*
    Leaves bright yellowish-green; branchlets and inflorescence glandular-pubescent .... 5. *A. patula.*
  Pedicels and ovaries pubescent.
    Leaves glabrous, bright green, shining.......... 6. *A. insularis.*
    Leaves tomentose, branchlets tomentose and glandular .... 7. *A. tomentosa.*

1. **A. glauca** Lindl. Foothills of the interior mountains throughout S. Cal. in the Coast Ranges from Santa Barbara to

Santa Monica the inflorescence is commonly glandular-pubescent. March.

2. **A. Parryana** Lemmon. Mt. San Antonio and adjacent peaks; Mt. Pinos; Tehachapi Mts., type locality.

3. **A. drupacea** Parry. In the Transition Zone, San Bernardino, San Jacinto and Cuyamaca Mts., type locality. Not common.

4. **A. pungens** H. B. K. In the Upper Sonoran and Transition Zones in the San Bernardino and San Diego Mts.; rather rare.

5. **A. patula** Greene. Not infrequent in the Upper Transition Zone of the San Bernardino, and San Jacinto Mts.

6. **A. insularis** Greene. Santa Cruz Island.

7. **A. tomentosa** Pursh. Ranges throughout our region from 200 m. in the Coast Ranges to 1,000 m. in the interior, it is very variable in the amount of pubescence, those in the coast regions being more hispid, and the leaves frequently cuspidate.

ORDER PRIMULALES.

Styles distinct; fruit an achene or utricle; ovule 1... 1. PLUMBAGINACEAE.
Styles united; fruit capsular or drupelike; ovules several .... 2. PRIMULACEAE.

1. PLUMBAGINACEAE. Plumbago Family.

Maritime perennials with basal leathery leaves and branching inflorescence of small white flowers, flowers regular, perfect, 5-merous throughout; calyx funnelform, the tube 10-ribbed, the limb scarious; petals clawed, the claws united at the base; ovary 1-celled, 5-angled; styles distinct or united into one; fruit a utricle.

1. LIMONIUM. Marsh Rosemary.

Herbs with broad basal leaves and numerous small white flowers, secund in short spikes on a branching scape; styles distinct. *(Statice.)*

1. **L. californicum** Small. Frequent in salt marshes along the coast.

2. PRIMULACEAE. Primrose Family.

Annual or perennial herbs with mostly simple, alternate, opposite or whorled leaves and perfect, regular flowers; calyx of 4-9 partially united sepals; corolla gamopetalous, usually 5-cleft, the lobes spreading or reflexed; stamens as many as the corolla lobes and opposite to them; ovary free (except in *Samolus*), 1-celled with a central placenta; styles 1; fruit a capsule.

Ovary inferior; sterile filaments 5; flowers racemose. 1. SAMOLUS.
Ovary superior, no sterile filaments.
  Flowers axillary and solitary on leafy stems; capsule circumscissile.
    Corolla longer than the calyx; leaves opposite; flowers red .... 2. ANAGALLIS.
    Corolla shorter than the calyx; leaves alternate; flowers white .... 3. CENTUNCULUS.
  Flowers umbellate or solitary on naked scapes; leaves basal.
    Corolla lobes reflexed; perennial................. 4. DODECATHEON.
    Corolla lobes erect; small annual.............. 5. ANDROSACE.

1. SAMOLUS. BROOKWEED.

Glabrous perennials with alternate fleshy, entire leaves and small, white, 5-merous flowers in terminal racemes; sepals united at the base, persistent and adherent to the base of the ovary; 5 staminodia alternate with the 5 fertile stamens; capsule 5-valved.

1. **Samolus floribundus** H.B.K. (S. valerandi americanus Gray.) Rather rare but generally distributed along watercourses and in marshes, both in the coastal and interior mountains. July.

2. ANAGALLIS. PIMPERNEL.

Spreading or prostrate annuals with opposite or alternate entire leaves, and red or occasionally blue flowers, axillary on slender peduncles; filaments bearded; capsule circumscissile.

1. **A. arvensis** L. Poor Man's Weather-glass. A common garden and wayside weed. San Gabriel, 1856.

Var. *coerulea* Ledeb. Rare in Los Angeles district; Fallbrook, 1884.

3. CENTUNCULUS. FALSE PIMPERNEL.

Small low annuals with mostly sessile, entire leaves and minute, solitary, white flowers in the axils; capsule circumscissile.

1. **C. minimus** L. Reported from San Diego; near Upland, *Munz.*

4. DODECATHEON. SHOOTING-STAR.

Perennials with mostly entire leaves, all basal or in rosettes; flowers showy, rose colored or purplish, borne on an umbellate scape; calyx reflexed in flower, longer than the tube; corolla tube short, the lobes reflexed; stamens 5, exserted; anthers large, the filaments short or wanting, united at the base; ovary free; capsule 5-valved at the apex.

Filaments united into an exserted tube.
  Corolla bright purple with a yellow base.......... 1. *D. Clevelandi.*
Filaments distinct to the base.
  Inflorescence glandular.
    Corolla enclosing the bases of the anthers; plants stout .... 2. *D. Jeffreyi.*
  Inflorescence and whole plant glabrous............ 3. *D. alpinum.*

1. **D. Clevelandi** Greene. Common on moist hillsides. Feb.-April.

2. **D. Jeffreyi redeolens** Hall. In a marsh at 2,100 m. alt., Prairie Fork, San Antonio Mts., *Johnston.*

3. **D. alpinum** Greene. Bluff Lake; San Jacinto Mts., *Hall.*

5. ANDROSACE.

Small delicate herbs with clustered leaves and small umbellate flowers on long pedicels; corolla white or nearly so.

1. **A. septentrionalis subulifera** Gray. San Gorgonio Mt., *Parish.*

ORDER EBENALES.

STYRACACEAE. Styrax Family.

Shrubs or trees with alternate simple leaves, no stipules, and regular, perfect flowers; calyx adherent at least to the base of the ovary; stamens mostly at least twice the number of the petals or lobes of the corolla, and more or less united with each other and to the base of the corolla; seeds few.

1. STYRAX. Storax.

Ours a shrub with ovate, entire leaves and few flowers on a short terminal peduncle; calyx persistent, denticulate; corolla of 5-8 soft-downy white petals united at base; stamens 10, filaments flat; fruit globular, 1-seeded .

1. **S. californica** Torr. Abundant in the San Bernardino Mts.; hills north of Glendale.

ORDER OLEALES.

OLEACEAE. Olive Family.

Trees, shrubs or herbaceous perennials, with opposite (rarely alternate) simple or pinnate exstipulate leaves and regular, 2-4-parted, perfect, polygamous or dioecious flowers in panicles, corymbs or fascicles; calyx usually small (sometimes none), of 4 or more sepals; corolla of 2-6 distinct petals or gamopetalous; stamens 2-4, adnate to the base of the corolla; ovary superior, 2-celled; fruit a capsule, samara, berry or drupe.

Fruit a samara; trees with pinnate leaves............ 1. FRAXINUS.
Fruit a drupe; shrubs with simple opposite leaves..... 2. FORESTIERA.
Fruit a capsule; suffrutescent plants with simple alternate leaves .... 3. MENODORA.

1. FRAXINUS. ASH.

Trees with opposite pinnate deciduous leaves and dioecious, polygamous or perfect flowers in small crowded panicles appearing before the leaves; calyx small with a toothed border; corolla with two equal petals or none; stamens 2-4; ovules 2-celled; fruit a samara winged at the apex and sides.

Corolla wanting.
  Lateral leaflets oblong to oval, sessile............. 1. *F. oregona.*
  Lateral leaflets round-ovate; petioles about 10 mm. long .... 2. *F. coriacea.*
  Lateral leaflets lanceolate, petioles 2 mm. long..... 3. *F. velutina.*
Corolla present; leaflets petioled.................... 4. *F. dipetala.*

1. **F. oregana** Nutt. Oregon Ash. Sparingly distributed in the canyons of the San Gabriel, San Bernardino and San Jacinto mountains and near Warner Hot Springs. April-May.

2. **F. coriacea** Wats. Leather-leaf Ash. Eastern base of Mt. San Jacinto at 600 meters alt.

3. **F. velutina** Torr. Arizona Ash. Southwestern base of San Jacinto Mt., *Jepson.*

4. **F. dipetala** H.&A. Flowering Ash. Somewhat rare and limited to the coastal regions. May.

2. FORESTIERA. IRONWOOD.

Tall slender branched shrub with simple, remotely serrate or entire opposite leaves and inconspicuous flowers in crowded clusters; calyx very small; corolla wanting; stamens 2-4; fruit a blue black drupe like a miniature olive.

1. **F. neomexicana** Gray. Common in the desert foothills near Big Rock Creek, and found in scattered groups westward through the desert and adjoining foothills; Tehachapi Mts. Locally known as the "wild olive." April.

3. MENODORA.

Low undershrubs or suffrutescent herbs with sessile, simple, mostly opposite entire leaves and bright yellow flowers; calyx with a short tube and 5-15 narrow lobes; corolla rotate or campanulate, 5- or 6-lobed; stamens 2 or 3 exserted; stigma capitate; capsule didymous, circumscissile.

Branches spinescent, puberulent; leaves minute...... 1. *M. spinescens.*
Branches not spinescent, glabrous; leaves linear or lanceolate .... 2. *M. scoparia.*

1. **M. spinescens** Gray. Providence Mountains. Big Rock Creek near Llano.

2. **M. scoparia** Engl. Colorado Desert.

ORDER GENTIANALES.

GENTIANACEAE. GENTIAN FAMILY.

Herbs with mostly opposite simple entire sessile leaves, no stipules and mostly showy flowers; calyx persistent, 4-6-lobed; corolla 4-6-lobed; stamens on corolla-tube as many as its lobes and alternate with them; anthers 2-celled opening lengthwise; ovary 1-celled with parietal placentae; style 1; stigma 2-lobed.

Corolla 4-5-lobed; anthers straight.................. 1. GENTIAN.
Corolla 5-lobed (occasionally 4-lobed) anthers twisted after shedding the pollen; annuals..... 2. ERYTHRAEA.
Corolla 5-6-lobed; anthers recurved in age; perennials. 3. EUSTOMA.
Corolla 4-parted; perennials......................... 4. FRASERA.

1. GENTIAN.

Ours simple herbs of the high mountain meadows with opposite leaves and showy flowers, single or in terminal clusters; calyx 4-5-cleft; corolla 4-5-lobed, funnelform, persistent, often with plaited folds in the sinuses; style none or very short.

Corolla not plaited at the sinuses, the lobes fringed or with internal crowns.
  Corolla lobes fringed on the margins; flowers sky blue.
    Lobes strongly fringed; flowers 1-6; upper leaves 2.5 cm. or more long.................. 1. *G. detonsa.*
    Lobes erose-dentate; flowers 1; upper leaves less than 2.5 cm. long..................... 2. *G. simplex.*
  Corolla lobes with a fringe of bristles at the base within .... 3. *G. acuta.*
Corolla plaited at the sinuses; lobes neither fringed or crowned; flowers whitish; upper leaves connate .... 4. *G. humilis.*

1. **G. detonsa** Rottb. Locally abundant in wet meadows near Knight's Camp, San Bernardino Mts., *Parish.*

2. **G. simplex** Gray. Occasional in the Transition and Canadian Zones. July.

3. **G. acuta** Michx. With the last.

4. **G. humilis** Stev. On the borders of a stream, S. fork, Santa Ana River, in the Canadian Zone. *Parish.*

2. ERYTHRAEA. Canchalagua.

Leafy annuals with branching upright stems and cymose flowers; calyx 5-parted; corolla salverform; anthers spirally twisted after dehiscence; style slender, deciduous; capsule elongated.

Corolla bright pink with a yellow center, 2.5 cm. long, lobes 12 mm. long.................... 1. *G. venusta.*

Corolla pink, 10 mm. long, lobes 3 mm. long; flowers all peduncled .... 2. *G. exaltata.*

Corolla rose color, 12 mm. long, lobes 4-6 mm. long; lateral flowers peduncled .... 3. *G. Muhlenbergii.*

1. **E. venusta** Gray. Common on light soils in the interior. May-June.

2. **E. exaltata** Hook. Borders of streams, on the desert slopes of the San Gabriel Mts.; San Bernardino and San Diego Co's. June-July.

3. **E. Muhlenbergii** Griseb. Southern borders of San Diego Co.

3. EUSTOMA.

Erect glaucous perennial with oblong, opposite, clasping leaves and large terminal bluish purple flowers, solitary, on long peduncles; corolla campanulate-funnelform, 5-6-lobed.

1. **E. silenifolium** Salisb. Low grounds, Colton and San Bernardino; Palm Springs. April-July.

4. FRASERA. Deer's Ears.

Glabrous perennials with entire linear, lanceolate, opposite or whorled leaves (frequently cartilaginous-margined) and numerous flowers in paniculate or thyrsoid cymes; calyx 4-lobed; corolla yellowish, dark dotted or lined, 4-parted, persistent with 1 or 2 fringed nectariferous glands; stamens 4; filaments distinct or united at the base; capsule ovoid, leathery.

Plant stout, 6-9 dm. high; flowers in loose panicle; petals 12 mm. long..................... 1. *F. Parryi.*

Plant 3 dm. high; flowers in cymose clusters; petals 8 mm. long.......................... 2. *F. neglecta.*

1. **F. Parryi** Torr. Frequent on dry slopes among the pines in Strawberry Valley; Bluff Lake, San Bernardino Mts. July.

2. **F. neglecta** Hall. Common on the northern slopes of the San Gabriel Mts., the type locality; Upper Holcomb Valley, San Bernardino Mts., *Parish.* July.

ORDER ASCLEPIADALES.

Styles united; stamens distinct or gynandrous; pollen loosely granular .... 1. Apocynaceae.

Styles distinct; stamens monodelphous; pollen united into waxy masses or the grains in groups of 4 .... 2. Asclepiadaceae.

APOCYNACEAE. Dogbane Family.

Herbs with milky juice, opposite entire exstipulate leaves, and regular 5-merous flowers; stamens borne on the corolla alternate with its lobes, anthers more or less coherent with the stigma; ovaries 2, both developing into long follicles; seeds usually with a tuft of silky down at the end.

Leaves alternate.
  Corolla tubular, about 10 mm. long; pods 5-7 cm. long, constricted between the seeds..... 1. Amsonia.
Leaves opposite.
  Corolla 3-5 mm. long; leaves ovate or lanceolate; calyx adnate to the back of the ovaries. 2. Apocynum.
  Corolla 20 mm. long; leaves few, obovate, thickish; calyx wholly free..................... 3. Cycladenia.

1. AMSONIA.

Perennial herbs with alternate entire leaves and tubular flowers in terminal cymes; corolla about 2 cm. long, narrow below, enlarging above, villous within; stamens included; pods erect, torulose.

Leaves ovate, subsessile; plant glabrous............. 1. *A. brevifolia.*
Leaves narrowly linear, sessile; plant pubescent or puberulent .... 2. *A. tomentosa.*

1. **A. brevifolia** Gray. In dry soil at Cactus Flat in the Pinon Zone, San Bernardino Mts., *Parish.*

2. **A. tomentosa** Torr. With the last.

2. APOCYNUM. Indian Hemp.

Glabrous perennials with ovate-lanceolate leaves and small flowers in terminal cymes; calyx small, deeply 5-cleft; corolla campanulate, 5-lobed bearing 5 triangular appendages near the base; pods slender terete; seeds comose.

Flowers greenish, corolla little exceeding the calyx lobes; foliage yellowish green.. 1. *A. cannabinum.*
Flowers pinkish white; corolla much exceeding the calyx lobes; foliage dark green..... 2. *A. androsaemifolium.*

1. **A. cannabinum** L. Borders of marshes and mountain streams; not common. July-August.

2. **A. androsaemifolium** L. Frequent in dry ground, Bear Valley. July-August.

3. CYCLADENIA.

Low glabrous perennial with a thick fleshy root and a simple stem with a few large ovate or obovate thickish leaves and axillary rose-purple flowers with long peduncles and slender pedicels; style with a conspicuous membranous ring under the stigma; disk an entire cup surrounding the ovary.

1. **C. venusta** Eastw. Mt. San Antonio and the high peaks of the San Gabriel Mts. May-July.

2. ASCLEPIADACEAE. Milkweed Family.

Perennial herbs with milky juice, opposite or whorled entire leaves and smallish flowers in axillary, mostly subglobose, umbels; flowers 5-merous, but carpels only 2; stamens joined to the stigma; pollen in waxy masses; fruit a follicle; seeds thin, flat, crowned with a coma of silky down.

Erect herbs; stems stout.
  An incurved horn projecting from the cavity of the hooded appendage.................. 1. Asclepias.
  No horn present.................................. 2. Gomphocarpus.
Twining or climbing herbs.......................... 3. Funastrum.

1. ASCLEPIAS. Milkweed.

Perennial herbs with alternate, opposite or whorled leaves and flowers in umbels, borne mostly near the top of the stem; calyx small, green; corolla deeply 5-parted, the lobes reflexed in anthesis; hoods of the crown of various shapes, not narrowed below, bearing hornlike processes within the hood; anther wings broader below the middle; stigma 5-angled, flat topped; follicles mostly smooth; seeds comose.

Leaves linear, glabrous, in whorls of 3-6; umbels pedunculated .... 1. *A. Mexicana.*
Leaves white-wooly, broad, ovate-lanceolate.
  Umbels on peduncles equalling or exceeding the pedicels; leaves often in threes.........
    Leaves coriaceous, denticulate erose on margins, nearly glabrate .... 2. *A. erosa.*
    Leaves soft, very woolly...................... 3. *A. eriocarpa.*
  Umbels sessile or terminal only pedicelled; leaves nearly sessile .... 4. *A. vestita.*
Leaves filiform or wanting; stems rush-like; peduncles shorter than pedicels.................. 5. *A. subulata.*

1. **A. Mexicana** Cav. Frequent on the mesas and foothills.

2. **A. erosa** Torr. San Diego Co.; Colorado Desert near Indio, *Fultz.* May.

3. **A. eriocarpa** Benth. Dry hills in the interior. July-Aug.

4. **A. vestita** H.&A. Borders of the Mohave Desert; San Diego Co. June-July.

5. **A. subulata** Decan. Near Salton Sea, *Mrs. Rothwell.* January.

2. GOMPHOCARPUS.

Closely resembling *Asclepias vestita,* differing only in the absence of the horn to the hood.

1. **G. tomentosus** Gray. Borders of the Mohave Desert; San Bernardino and San Diego Co's., not common.

Var. *Xanti* Gray. Hoods oval and more dependent. Fort Tejon; Ojai Valley.

3. FUNASTRUM.

Twining or climbing herbs with opposite entire leaves and umbellate flowers; calyx 5-parted; corolla deeply 5-cleft, an entire or crenate ring forming a crown in its throat, the ring of monodelphous filaments bearing behind each anther a fleshy and flattened appendage; otherwise as in *Asclepias.* *(Philabertella.)*

Plant weak, twining, glabrous or nearly so; leaves long, linear, with dilated or auricled base 1. *F. heterophyllum.*
Plant slender, erect, climbing, densely pubescent; leaves linear, tapering at base.......... 2. *F. hirtella.*

1. **F. lineare heterophyllum** Macbr. Widely distributed in the foothills, but not common.

2. **F. hirtellum** Schltr. San Bernardino and Riverside Co's. and borders of the Colorado Desert. April-June.

ORDER POLEMONIALES.

Stamens 5.
Gynoecium of 2 distinct carpels.................. 1. DICHONDRACEAE.
Gynoecium of 2 or more partially or wholly united carpels.
Fruit drupaceous or of 2 or 4 nutlets.
Style or stigma furnished with a glandular ring 6. HELIOTROPACEAE.
Style or stigmas without a glandular ring..... 7. BORAGINACEAE.
Fruit capsular or baccate, the ovary never 4-lobed.
Styles or stigmas wholly united.
Corolla regular ....10. SOLANACEAE.
Corolla usually irregular..................
Styles or stigmas distinct.
Ovary 3-celled; stigmas 3. 3. CONVOLVULACEAE.
Calyx lobes imbricated; corolla mostly plaited in the bud.....................11. SCROPHULARIACEAE.

  - Calyx lobes valvate; corolla merely convolute in the bud .... 4. POLEMONIACEAE.
- Ovary 1- or 2-celled, rarely 4 celled; stigmas 2
  - Ovary 1-celled .... 5. HYDROPHYLLACEAE.
  - Ovary 2-celled or 4-celled.
    - Corolla unappendaged within; plants with normal leaves .... 3. CONVOLVULACEAE.
    - Corolla appendaged within; parasitic twining plants with scale-like leaves. 2. CUSCUTACEAE.
- Stamens 4 and didynamous or 1 or 2.
  - Carpels ripening into nutlets (grouped in 4's) or into achenes or drupes.
    - Style apical on the entire ovary................ 8. VERBENACEAE.
    - Style rising between the 4 lobes of the ovary.... 9. MENTHACEAE.
  - Carpels ripening into a capsule.
    - Placentae of the ovary axile.
      - Ovary 1-celled ....13. PINGUICULACEAE.
      - Ovary 2-celled, rarely 3- or 5-celled.
        - Corolla lobes imbricated; capsules not elastically dehiscent ....11. SCROPHULARIACEAE.
        - Corolla lobes convolute; capsules elastically dehiscent ....12. ACANTHACEAE.
    - Placentae of the ovary parietal.
      - Plants parasitic; leaves scalelike without green coloring matter ....14. OROBANCHACEAE.
      - Plants not parasitic; leaves green.
        - Ovary and capsule 2-celled; shrubs; seeds winged ....15. BIGNONIACEAE.
        - Ovary and capsule 1-celled; herbs; seeds wingless ....16. MARTYNIACEAE.

1. DICHONDRACEAE. DICHONDRA FAMILY.

Annual or perennial creeping herbs with small petiolate entire leaves having orbicular or reniform blades, the inconspicuous solitary flowers on short peduncles; calyx of 5 distinct or nearly distinct sepals; corolla about 5 mm. in diameter, rotate or campanulate, 5-lobed; stamens 5, shorter than the corolla; pistil of 2 carpels; styles 2, distinct; capsule 2-celled, indehiscent; seeds solitary, smooth.

1. DICHONDRA.

Characters of the family.

1. **D. occidentalis** House. On the coast south of San Diego.

2. CUSCUTACEAE. DODDER FAMILY.

Parasitic herbs with twining, filiform, golden yellow, leafless stems and small white flowers usually in dense clusters; calyx of 5 or 4 imbricated lobes accompanied by as many alternating, crenulate or appendaged scales, or these obsolete; stamens 5 or 4, attached to the corolla in the throat or near the sinuses above the scales; ovary 2-celled; styles 2, mostly distinct; capsules subglobose, depressed or conical, circumscissile or indehiscent, 1-4-seeded.

1. CUSCUTA. Dodder.

Characters of the family.

- Capsule depressed-globose.
  - Flowers 2 mm. long, smooth.
    - Corolla lobes obtuse, spreading.................. 1. *C. glandulosa.*
    - Corolla lobes acute, tips inflexed.................. 2. *C. pentagona.*
  - Flowers fleshy, slightly papillate.
    - Corolla 2-5 mm. long, tips inflexed; scales prominent .... 3. *C. indecora.*
- Capsule globose or conic.
  - Flowers 2 mm. long.
    - Calyx lobes denticulate......................... 4. *C. denticulata.*
    - Calyx lobes deltoid........................... 5. *C. Veatchii.*
  - Flowers more than 2 (usually 5) mm. long.
    - Corolla lobes more than half as long as the corolla tube .... 6. *C. californica.*
    - Corolla lobes less than half as long as the tube.
      - Calyx lobes half as long as the corolla tube... 7. *C. subinclusa.*
      - Calyx lobes equalling the corolla tube......... 8. *C. salina.*

1. **C. glandulosa** Small. San Bernardino, *Yuncker.*

2. **C. pentagona calycina** Engelm. (C. arvensis Beyr.) Occasional near Los Angeles and Redondo.

3. **C. indecora neuropetala** Hitchcock. San Bernardino Co., *Yuncker.*

4. **C. denticulata** Engelm. San Bernardino Mts.; Mohave Desert to San Diego.

5. **C. Veatchii** Brandg. Needles, *Yuncker.*

6. **C. californica** Choisy. The type with pedicelled flowers is common on *Eriogonum* and *Adenostoma* throughout S. California.

Var. *breviflora* Engelm. Flowers subsessile; styles shorter than the ovary. Catalina Island, *Yuncker.*

Var. *papillosa* Yuncker. Flowers papillose. San Jacinto Mt.; Riverside and San Diego Co's.

Var. *apiculata* Engelm. On the Colorado.

7. **C. subinclusa** D.&H. Common on foothill shrubs.

8. **C. salina** Engelm. Plentiful on salt marsh plants from Santa Barbara to San Diego.

Var. *major* Yuncker. Flowers larger; corolla lobes broadly ovate. San Diego and Los Angeles Co's., *Yuncker.*

Var. *acuminata* Yuncker. Perianth divisions acuminate. S. E. California, *Yuncker.*

3. CONVOLVULACEAE. Morning-glory Family.

Annual or perennial herbs usually twining or trailing; leaves alternate, petiolate, exstipulate; peduncle axillary, 1-3-flowered or cymose; flowers white or pink, regular 5-merous; sepals persistent; stamens as many as the corolla lobes and alternate with them; styles more or less united; fruit a capsule, 1-5-celled.

Styles 2, partially united; corolla small, deeply 5-lobed; leaves small, entire............. 1. Cressa.
Styles united up to the stigma; flowers large, funnelform except *C. pentapetaloides.*
  Stigmas 1-3, ovoid or subglobose.................. 2. Ipomoea.
  Stigmas usually 2, filiform or oblong-cylindric..... 3. Convolvulus.

1. CRESSA.

Low perennials with slender erect stems bearing numerous small entire sericeous leaves and small flowers axillary in the upper axils; calyx of 5 subequal lobes; corolla persistent, 5-lobed; stamens exserted; capsule 1-seeded.

1. **C. truxillensis** H.B.K. Common in hard subsaline soils along the coast and on the deserts. May-August.

2. IPOMOEA. Morning-glory.

Stigmas ovoid or subglobose, otherwise as in *Convolvulus.*

Leaves angulate-3-lobed; fruiting pedicels equalling the calyx .... 1. *I. hirsutula*
Leaves entire; fruiting pedicels twice the length of the calyx .... 2. *I. purpurea.*

1. **I. hirsutula** Jacq. Orange grove near Riverside. 1915.

2. **I. purpurea** Lam. Common Morning-glory. An escape from cultivation and occasionally a troublesome weed.

3. CONVOLVULUS. Bindweed.

Annual or perennial, twining or trailing herbs with petiolate usually hastate or cordate leaves and mostly solitary axillary white or pink flowers; peduncles bracteate; corolla funnelform, the limb entire or somewhat angled; stamens included; capsule 2-4-valved.

Calyx enveloped by 2 large, conspicuous bracts.
  Stigmas ovate or oblong; foliage glabrous.
    Leaves reniform, fleshy; flowers pink or purplish. 1. *C. Soldanella.*
    Leaves ovate-hastate; flowers white............ 2. *C. sepium.*

- Stigmas linear or oblong-linear.
  - Calyx closely invested by the bracts.
    - Stems twining or high climbing.
      - Basal auricles of the blades divergent.
        - Foliage glabrous.
          - Bracts orbicular, rounded, mucronate... 3. *C. cyclostegius.*
          - Bracts ovate-lanceolate, acute........... 4. *C. occidentalis.*
          - Bracts very large, 2.5 cm long; 3-flowered; leaf-blades deltoid-cordate.... 5. *C. macrostegius.*
        - Foliage pubescent or tomentose.
          - Leaf auricles toothed or bifid........... 6. *C. Greenei.*
          - Leaf-blades sagittate, lower subsessile... 7. *C. aridus.*
      - Basal auricles of the blades not divergent; foliage pubescent .... 8. *C. Binghamiae.*
    - Stems trailing or prostrate, rarely the tips twining.
      - Leaf-blades deltoid, pubescence dense, velvety 9. *C. tomentellus.*
      - Leaf-blades linear-hastate, glabrous and glaucous; bracts distant from calyx and linear ....10. *C. longipes.*
      - Leaf-blades triangular-hastate, foliage canescent; bracts simulating leaves, one inserted above the other.................11. *C. gracilentus.*
- Stigmas filiform or narrowly linear.
  - Bracts subulate, near middle of peduncle; leaves glabrous, oblong-sagittate ....12. *C. arvensis.*
  - Bracts linear-spatulate, near the calyx; leaves oblong-lanceolate; plant annual, with small pink flowers ....13. *C. pentapetaloides*

1. **C. Soldanella** L. Beach Morning-glory. Common on the seashore sands. May-August.

2. **C. sepium** L. Hedge Convolvulus. Near University Station. May.

3. **C. cyclostegius** House. This is the common species at Santa Barbara. April-June.

4. **C. occidentalis** Gray. The common species of the coast hills from Los Angeles to San Diego. April-June.

5. **C. macrostegius** Greene. Catalina Island, rare and local. April-June.

6. **C. Greenei** House. Frequent in the inner coast ranges. May-June.

7. **C. aridus** Greene. Desert foothills in the interior of southern California, type locality.

8. **C. Binghamiae** Greene. Very common on stream banks at Riviera and on the Los Angeles and San Gabriel Rivers in that vicinity. May-August.

9. **C. tomentellus** Greene. Mountains of southern California, type locality.

10. **C. longipes** Wats. Tehachapi Mountains. May-June.

11. **C. gracilentus** Greene. North side of the San Gabriel Mts.; San Bernardino Mts. June-July.

12. **C. arvensis** L. Field Morning-glory. Common in wastes and cultivated ground; a serious pest and almost impossible to eradicate. San Bernardino 1890. June-Sept.

13. **C. pentapetaloides** L. Point Firmin; Hollywood; occasional in city streets, Los Angeles. San Diego; Sweetwater Valley, 1884.

4. POLEMONIACEAE. PHLOX FAMILY.

Annual or perennial herbs or low shrubs with opposite or alternate simple or compound leaves and regular 5-merous flowers except the pistil which is 3-merous, styles united; stigmas 3; fruit a 3-celled capsule; seeds commonly mucilaginous when wetted.

Calyx not ruptured by the maturing capsule, calyx teeth herbaceous.
Leaves pinnatifid; flowers large; stamens declined.. 1. POLEMONIUM.
Leaves simple, entire (except *C. heterophylla*); stamens straight .... 2. COLLOMIA.
Calyx ruptured by the maturing capsule.
Calyx lobes unequal, pungent; leaves alternate.... 3. NAVARRETIA.
Calyx lobes equal, rarely pungent.
Calyx tube not at all or slightly scarious between the lobes; leaves divided into spinulose segments .... 6. LEPTODACTYLON.
Calyx tube more or less scarious between the lobes.
Corolla salverform.
Annuals; leaves alternate above............ 4. MICROSTERIS.
Perennials; leaves all opposite............ 9. PHLOX.
Corolla funnelform or tubular with open throat.
Leaves alternate .... 5. GILIA.
Leaves opposite .... 8. LINANTHUS.
Corolla irregular .... 7. LANGLOISIA.

1. POLEMONIUM. JACOB'S LADDER.

Perennial herb with alternate pinnatifid leaves and dark blue flowers in terminal panicles; corolla campanulate; stamens equally inserted; filaments more or less declined and hairy at base.

1. **P. coeruleum** L. Bear Valley, *Hall;* S. Fork, Santa Ana, *Wilder;* in each instance only a single plant.

2. COLLOMIA.

Erect annuals with usually simple, entire leaves and flowers crowded at the top of the stem; calyx scarious between the lobes, not distended by the capsule; corolla tubular with a funnelform throat and lobed limb; stamens unequally inserted; seeds few in each cell. *(Gilia.)*

Leaves lanceloate, entire; seeds 1 in each cell.
Corolla orange, slender, 3 times as long as the calyx .... 1. *C. grandiflora..*
Corolla purple, slender, 2 times as long as the calyx .... 2. *C. linearis.*
Leaves variously cleft; corolla deep purple; seeds 2 or 3 in each cell. 3. *C. heterophylla.*

1. **C. grandiflora** Benth. Frequent in open pine woods, San Jacinto; San Bernardino and Tehachapi Mts. July.

2. **C. linearis** Nutt. Bear Valley. July-August.

3. **C. heterophylla** Hook. Shady places in the chaparral zone; San Bernardino Mts., *Parish.*

3. NAVARRETIA.

Glabrous or viscid-pubescent annuals with alternate setaceously or spinosely pinnatifid leaves and flowers crowded in bracted clusters on the ends of the branches; calyx tube scarious between the ribs not accrescent, segments unequal; stamens subequally inserted. *(Gilia.)*

Leaves rigid spinescent; plant erect.
Corolla yellow, not exceeding calyx............... 1. *N. Breweri.*
Corolla white, small; leaves very broad............ 2. *N. foliacca.*
Corolla purple.
Flowers 8-10 mm. long, throat yellow, seeds 3-6. 3. *N. viscidula.*
Flowers 12-18 mm. long; seeds 6-10............. 4. *N. atractyloides.*
Flowers 10-12 mm. long; leaves with upper spines recurved; seeds 12..................... 5. *N. hamata.*
Leaves not spinescent, lax, 5-10 cm. long, segments linear; plant prostrate.................. 6. *N. prostrata.*

1. **N. Breweri** Greene. On dry slopes Bear Valley, *Parish.*

2. **N. foliacea** Greene. Dry mesas, Monterey to San Diego Co.

3. **N. viscidula** Benth. Common on foothill slopes. June-August.

4. **N. atractyloides** H.&A. Frequent on light valley soils. May-July.

5. **N. hamata** Greene. Monterey to San Diego Co., *Chandler.*

6. **N. prostrata** Greene. Abundant in restricted localities, near Downey; Bixby; Inglewood. May-June.

4. MICROSTERIS.

Small much branched annuals, leafy to the top with entire or cleft leaves, mostly alternate, and small flowers in pairs or few in a cluster; stamens unequally inserted, capsule splitting the calyx. *(Gilia.)*

Leaves entire, lower ones opposite.
  Stems erect, lax.................................. 1. *M. gracilis.*
  Stems short, very crowded, depressed............ 2. *M. micrantha.*
Leaves entire, all alternate; corolla white, little exceeding the densely white pubescent calyx .... 3. *M. depressa.*
Leaves alternate, variously lobed and divided.
  Corolla purple, with very small lobes............ 4. .*M. gilioides.*
  Corolla white, limb broad as long................. 5. *G. Traskiae.*

1. **M. gracilis** Hook. In the coast ranges south to San Diego; occasional in the mountains. April-May.

2. **M. micrantha** Greene. Big Rock Creek and neighborhood in the Mohave Desert. June.

3. **M. depressa** Jones. Rabbit Springs, Mohave Desert, *Parish.*

4. **M. gilioides** Greene. Occasional in the Sierra Madre and Santa Monica mountains. May-August.

Var. *Benthamiana* Brand. A smaller plant with narrow leaf segments. Bear Valley; Tehachapi Mts.; June-July.

5. **M. Traskiae** Eastw. Catalina Island, type locality.

5. GILIA.

Annual or perennial herbs with alternate mostly pinnately lobed or toothed leaves; calyx split by the enlarging capsule, scarious between the lobes; corolla tubular-funnelform with open throat and usually short limb.

Plant with leaves mostly basal, upper ones bract-like; flowers in an open panicle.
  Basal leaves ovate, spatulate, margins toothed; corolla pink, 5 mm. long............... 1. *G. latifolia.*
  Basal leaves strap shaped, few-toothed.
    Corolla 15 mm. long, throat widely dilated, limb purple .... 2. *G. Davyi.*
    Corolla 8 mm. long, narrow pinkish............ 3. *G. leptomeria.*
  Basal leaves once pinnatifid; corolla yellow, 8 mm. long .... 4. *G. ochroleuca.*
  Basal leaves twice pinnatifid.
    Corolla 10 mm. long, throat abruptly dilated, limb purple .... 5. *G. latiflora.*
    Corolla 12 mm. long, slightly dilated, limb purple; stamens exserted.................. 6. *G. leptantha.*

Corolla 8 mm. long, funnelform, throat yellow, lobes purple .... 7. *G. inconspicua.*
Basal leaves thrice pinnatifid; corolla 20 mm. long, slender filiform, purple................ 8. *G. tenuiflora.*
Plant somewhat leafy above, leaves pinnately divided into linear divisions; flowers clustered on naked peduncles.
Flower clusters with pedicels apparent.
Corolla 12 mm. long, bright blue, nearly tubular; flowers few .... 9. *G. Nevinii.*
Corolla 8-12 mm. long, dark blue, open funnelform; calyx herbaceous................10. *G. multicaulis.*
Corolla 12-18 mm. long, blue, funnelform; stamens equalling the lobes; calyx hyaline. 11. *G. abrotanifolia.*
Flower clusters head-like, pedicels seldom apparent.
Corolla broad, funnelform, deep blue, tube 4 mm. long ....12. *G. achilleaefolia.*
Plant erect, rigid, heads white-woolly; leaf divisions few, linear.
Perennial; corolla large, the tube 2-4 times as long as the calyx........................13. *G. densifolia.*
Annual; corolla-tube often less than 2 times as long as the calyx.
Corolla pale blue, the narrow lobes much shorter than the tube; anthers scarcely exserted. 14. *G. filifolia.*
Corolla dark blue or yellow, the lobes at least one-half as long as the tube; anthers exserted.
Corolla dark blue, throat yellow; stems simple, erect ....15. *G. virgata.*
Corolla yellow ....16. *G. lutescens.*
Plant erect, loosely branched; heads few-flowered, not white woolly; corolla 15-30 mm. long ....17. *G. Grinnellii.*

1. **G. latifolia** Wats. Watermans, Mohave Desert, *Brandegee.*

2. **G. Davyi** Milliken. Winchester, *Hall;* near Gorman Station; west end of Antelope Valley, type locality. May.

3. **G. leptomeria** Gray. Byrne's Spring, San Bernardino Co., *Parish.*

4. **G. ochroleuca** Jones. Northern edge of the Mohave Desert.

5. **G. latiflora** Gray. Frequent in the Mohave Desert and the higher mountains of Los Angeles and San Bernardino Co.'s. May-June.

Var. *exilis* Gray. Ranging on the mountains with the type; it is a more slender plant with flowers one-half the size.

6. **G. leptantha** Parish. Seven Oaks, type locality.

7. **G. inconspicua** Dougl. Common on the Mohave and Colorado Deserts. June.

Var. *sinuata* Gray. Flowers 2 or 3 times larger. General on the Mohave Desert; occasional on the San Jacinto Mts.

8. **G. tenuiflora** Benth. Common on the Mohave Desert and in the pine belt in all our mountains. June.

Var. *altissima* Parish. More slender in habit and possessing conspicuous black-tack glands on the pedicels. San Bernardino and San Gabriel mountains at a higher elevation than the type. June-July.

9. **G. Nevinii** Gray. San Clemente and Catalina Islands, type locality. May.

10. **G. multicaulis** Benth. Frequent in the foothills and coast ranges. May.

11. **G. abrotanifolia** Nutt. Common and generally distributed on sandy plains. May-June.

12. **G. achilleaefolia** Benth. Common and widely distributed in the foothills.

13. **G. densifolia** Benth. Mt. Pinos; near Seven Oaks, San Bernardino Co. June.

Var. *elongata* Gray. Leaves spreading, not imbricated, usually irregularly pinnatifid and white-tomentose. Common in dry soils and sand washes from San Bernardino Co. to San Diego Co. May-July.

Var. *sanctora* Milliken. Larger flowered with corolla twice as long as in the type. Santa Ana River near Riverside, *Hall;* Lytle Creek, *Parish.* June-August.

14. **G. filifolia** Nutt. Santa Barbara; Catalina Island; Mt. Pinos; Potrero, San Diego Co. May-July.

Var. *diffusa* Gray. Stems decumbent at base and branched. San Diego Co. May.

15. **G. virgata** Steud. Common on sandy plains and foothills especially in the interior. May-July.

Var. *floccosa* Milliken. Inflorescence more woolly; plant lower and much branched; corolla paler, the lobes about as long as the tube. Common on the Colorado and Mohave Deserts. May-July.

Var. *sapphirina* Macbr. Not uncommon in San Diego Co., *Macbride;* Sierra Madre; San Bernardino; San Jacinto Mt., type locality.

16. **G. lutescens** Steud. Ravenna, Los Angeles Co.,.June-Aug.

17. **G. Grinnellii** Brand. In open pine forests in the San Gabriel Mts. June-August.

6. LEPTODACTYLON.

Very leafy tufted perennials or undershrubs with mostly alternate leaves fascicled in the axils, palmately 3-7-parted, acerose or subulate, rigid and pungent; flowers showy, Phlox-like, white or lilac, solitary and sessile. *(Gilia.)*

Stems 6-12 dm. high; corolla over 25 mm. long, lobes broad, rose-colored.............. 1. *L. californicum.*
Stems 6 dm. or less............................
  Leaves crowded, nearly covering stems; corolla lilac tinged .... 2. *L. pungens.*
  Leaves less crowded, pubescent; flowers white..... 3. *L. Hookeri.*
  Leaves mostly opposite, very pungent, nearly glabrous .... 4. *L. Hallii.*
  Leaves alternate, palmately 3-parted; flowers light yellow .... 5. *L. tenuiloba.*

1. **L. californicum glandulosum** Eastw. A common foothill shrub. April-June.

2. **L. pungens** Benth. Mt. Tahquitz, *Hall.*

3. **L. Hookeri** Nutt. Occasional in the San Gabriel and San Bernardino Mts., at an alt. of about 2,000 meters. June-July.

4. **L. Hallii** Parish. Coyote Canyon, Santa Rosa Mts., *Hall.*

5. **L. tenuiloba** Parish. Occasional in rocky places in the Upper Transition Zone in Los Angeles and San Bernardino Co.'s. San Jacinto Mts., type locality. June-July.

7. LANGLOISIA.

Low or prostrate annuals with pinnately divided leaves, their toothed margins and the sepals bearing long, slender white bristles; flowers sessile or subsessile, solitary, small. *(Gilia.)*

Corolla bilabiate; leaves of nearly equal breadth throughout.
  Corolla whitish, slightly bilabiate, lobes half the length of the tube.................... 1. *L. Schottii.*
  Corolla streaked reddish-purple, strongly bilabiate, lobes equalling tube.................. 2. *L. Matthewsii.*
  Corolla yellowish, strongly bilabiate, lobes equalling tube .... 3. *L. flaviflora.*
Corolla regular, streaked with pink; leaves abruptly dilated at apex........................ 4. *L. setosissima.*

1. **L. Schottii** Greene. Frequent on the Colorado Desert. May.

2. **L. Matthewsii** Greene. Common on the Mohave Desert. June.

3. **L. flaviflora** Davidson. Willow Springs, Mohave Desert. May.

4. **L. setosissima** Gray. Palm Springs and Box Canyon, Colorado Desert, *Coolidge.*

8. LINANTHUS.

Annual or perennial, mostly slender herbs with commonly opposite, palmately parted leaves and flowers solitary or in terminal clusters; stamens equally inserted; seeds many in each cell. (*Gilia* in part.)

- Annual.
  - Flowers in densely bracted heads.
    - Corolla 20 mm. or more long, tube very narrow.
      - Corolla 25 mm. long with brown or yellow throat, limb purple, broad.............. 1. *L. androsaceus.*
      - Corolla 20 mm. long tube purple, throat spotted, lobes light purple................. 2. *L. breviculus.*
      - Corolla tube very slender, white, lobes white or yellowish .... 3. *L. parviflorus.*
      - Corolla tube red, throat purple spotted, limb white .... 4. *L. montanus.*
    - Corolla less than 20 mm. long.
      - Corolla 12-15 mm. long, tube little exceeding calyx, throat purple or yellow, limb purple or pink......................... 5. *L. ciliatus.*
      - Corolla 12-18 mm. long, rose purple, throat yellow .... 6. *L. bicolor.*
      - Corolla 6 mm. long, yellow, limb whitish...... 7. *L. Lemmoni.*
      - Corolla 8 mm. long, white, tube equalling calyx; calyx 4 mm. long............. 8. *L. maculatus.*
  - Flowers distinct, sessile or short pedicelled.
    - Stems dichotomously branched.
      - Corolla 25 mm. long, lobes very broad, light purple .... 9 *L. dichotomus.*
      - Corolla 12 mm. long, slightly exceeding the calyx ....10. *L. Bigelovii.*
  - Flowers long pedicelled.
    - Corolla broad, funnelform, limb purple, margins fringed ....11. *L. dianthiflorus.*
    - Corolla 4 mm. long, white or purple, slightly exceeding calyx; stems capillary.
      - Calyx lobes bristle tipped...................12. *L. pusillus.*
      - Calyx lobes broadly acute.................13. *L. Harknessii.*
    - Corolla 10 mm. long, white or pinkish; pedicels capillary ....14. *L. liniflorus.*
  - Flowers short pedicelled, bright yellow...........15. *L. aureus.*
  - Flowers few, mostly terminal, sessile or subsessile, somewhat clustered.
    - Corolla 15 mm. long, tube short, throat broadly expanded with appendages at base.......16. *L. Parryae.*
    - Corolla white, 10 mm. long, without appendages. 17. *L. dactylophyllum.*
    - Corolla 25 mm. long, tube 12 mm. long, red, little exceeding calyx, limb pinkish.......18. *L. pacificus.*
    - Corolla 12 mm. long, white, tube 1 mm. long....19. *L. concinnus.*

Perennial.
  Flowers yellow, somewhat crowded in the heads.
    Flowers sessile; leaves broadly linear, weak, recurving; plant stout....................20. *L. Nuttallii.*
    Flowers pedicelled; leaves linear, stiff, erect; plant slender ....21. *L. saxiphilus.*
  Flowers white, throat yellowish, pedicelled in small loose clusters; leaves narrow-linear.....22. *L. floribundus.*

1. **L. androsaceus** Greene. Transition Zone, San Bernardino and San Jacinto Mts. July.

2. **L. breviculus** Greene. Mohave Desert and adjacent mountains. June.

3. **L. parviflorus** Greene. (Gilia micrantha Steud.) Frequent in the coastal hills from Santa Barbara to San Diego. April-June.

4. **L. montanus** Greene. Frequent on dry slopes, San Bernardino Mts., *Parish.*

5. **L. ciliatus** Greene. Common on all the higher mountains. June-July.

6. **L. bicolor** Greene. Santa Barbara; Catalina Island.

7. **L. Lemmoni** Greene. Mountains of San Bernardino, Riverside and San Diego Co.'s; Colorado Desert, not common. May-June.

8. **L. maculatus** Millik. Borders of the Colorado Desert.

9. **L. dichotomus** Benth. On the interior hills from San Diego northward; common in some places on the Mohave Desert. The flowers open nearly simultaneously about 5 p. m., when *L. Parryae* closes. May.

10. **L. Bigelovii** Greene. Colorado Desert. May.

11. **L. dianthiflorus** Greene. Fringed Gilia. Common and general on sandy soils, more abundant towards the coast. March-May.

12. **L. pusillus** Greene. San Jacinto; Witch Creek, San Diego Co., *Milliken.*

13. **L. Harknessii** Greene. Occasional on dry hillsides in the interior, *Abrams.*

14. **L. liniflorus** Greene. Common on dry plains and foothill slopes. May-July.

15. **L. aureus** Greene. Very common in sandy soils, San Fernando Valley; Mohave Desert; San Bernardino Co.; Santa Barbara, type locality. May-June.

16. **L. Parryae** Greene. Common on the Mohave Desert and adjacent mountains. May.

17. **L. dactylophyllum** Torr. Near Needles; Barstow; rarely collected.

18. **L. pacificus** Millik. Cootca, Palomar, type locality.

19. **L. concinnus** Millik. Elysian Park; Glendale; Big Rock Creek; San Antonio Mts., at 1,800 meters, type locality. July.

20. **L. Nuttallii** Greene. Inyo Co., probably not in our district.

21. **L. saxiphilus** Davidson. Rocky hillsides above Seven Oaks, type locality. July.

22. **L. floribundus** Greene. Limited to local situations, San Jacinto; Elsinore; Coyote Canyon, Riverside, *Hall;* Modjeska's Ranch, Orange Co., *Payne.*

9. PHLOX.

Low matted or erect perennials with entire opposite leaves and salverform, purple, white or yellow flowers.

Plants low, matted.
  Leaves crowded; calyx without salient angles...... 1. *P. Douglasii.*
  Leaves less crowded; calyx conspicuously pubescent, with salient angles.......... ... 2. *P. austromontana.*
Plants erect.
  Leaves narrow lanceolate, 6-8 mm. wide; corolla 4-5 cm. long, white.................... 3. *P. dolicantha.*

1. **P. Douglasii** Hook. San Antonio Mts., *Hall.*

2. **P. austromontana** Coville. San Bernardino and San Jacinto Mts. July.

3. **P. dolicantha** T.&G. Bear Valley, San Bernardino Mts.; hills near Mecca and borders of the Colorado Desert. May.

5. HYDROPHYLLACEAE. PHACELIA FAMILY.

Herbs or shrubs with opposite or alternate leaves and perfect flowers; calyx persistent, 5-parted; corolla deciduous or persistent, 5-lobed; stamens 5, alternating with the corolla lobes; style 1, partially cleft or distinct to the base; fruit a 1-celled capsule or 2-celled by the union of the placentae; seeds few or many with a reticulate or pitted coat.

Style 2-cleft at apex.
  Leaves, at least the lower, opposite.
    Calyx with a reflexed lobe at each sinus......... 1. NEMOPHILA.
    Calyx naked at the sinus..................... 2. EUCRYPTA.

Leaves all, or all but the lowest, alternate.
Calyx lobes all similar, or nearly so.
Corolla blue, purple or white, deciduous...... 3. PHACELIA.
Corolla light yellow, persistent.............. 4. EMMENANTHE.
Calyx lobes very dissimilar, the 3 outer much enlarged .... 5. TRICARDIA.
Leaves alternate; peduncles basal, 1-flowered....... 6. HESPEROCHIRON.
Styles 2, distinct to the base.
Ovules and seeds 2 in each cell................. 7. LEMMONIA.
Ovules and seeds numerous.
Herbs, leaves entire or sinuate-dentate.......... 8. NAMA.
Herbaceous perennial; leaves undulate-dentate; seeds longitudinally striate........... 9. TURRICULA.
Shrubs ....10. ERIODYCTON.

1. NEMOPHILA.

Diffuse annuals with tender herbage, pinnately lobed or divided leaves and axillary peduncles, usually 1-flowered; calyx 5-parted, usually with a supplementary reflexed lobe at each sinus; corolla deeply 5-lobed, broadly campanulate to nearly rotate, the throat appendaged within with 10 scales or plaits; stamens and style mostly shorter than the corolla, filaments naked; capsules 2-valved, 1-16-seeded.

Angles of stems prickly, leaves, at least the upper, alternate.
Petioles broadly winged and clasping at base; flowers 1-3 cm. across.................. 1. *N. aurita.*
Petioles not winged or clasping; flowers less than 1 cm. across......................... 2. *N. racemosa.*
Angles of stems not prickly; leaves opposite.
Flowers 1 cm. or more across.
Corolla deep or pale purple, veined and dotted; scales adherent or free at tip........... 3. *N. Menziesii.*
Flowers 1 cm. or less across.
Leaves oblong in outline, pinnately 5-7-lobed; corolla white or pale blue, the lobes nearly equalling the tube, 2-3 mm. across; scales linear .... 4. *N. pedunculata.*
Leaves spatulate in outline, the tip with 3 acute lobes; scales small, laciniate or obsolete .... 5. *N. spathulata.*

1. **N. aurita** Lindl. Common in moist shady places near the coast from Santa Barbara to San Diego. March-April.

2. **N. racemosa** Nutt. Frequent on the Channel Islands and the coast near San Diego, type locality. April-May.

3. **N. Menziesii** H. & A. Baby Blue Eyes. Common on sandy plains and foothills. March-April.

Var. *integrifolia* Parish. Leaves more pubescent, less divided or nearly entire; flowers nearly white, smaller, scales half free.

Common in the interior mountains of San Bernardino; Los Angeles and San Diego Co's.

4. **N. pedunculata** Dougl. Santa Inez Mts., *Chandler.*

Var. *sepulta* Nels & Macbr. Corolla lobes longer than the tube, 3-7 mm. across, white dotted with blue toward the centre. Bear Valley, type locality. July.

5. **N. spathulata** Cov. Round Valley, San Jacinto Mt., *Hall.* Frequent in the mountains west of Tehachapi. June-July.

2. EUCRYPTA.

Somewhat hirsute annuals with leaves opposite or the uppermost alternate, once to thrice pinnatifid; flowers small, on solitary simple peduncles in the forks, or bractless and loosely racemose at the summit of the branches; corolla white or whitish, campanulate, the internal appendages at base minute or obsolete; stamens and style shorter than the corolla; filaments naked; capsule nearly as in *Nemophila.* *(Ellisia.)*

Leaves once pinnately parted; ovules 4.......... 1. *E. membranacea.*
Leaves twice or thrice pinnatifid; ovules 8...... 2. *E. chrysanthemifolia.*

1. **E. membranacea** Benth. Occasional in shady nooks from Gorman Station to San Diego. May.

2. **E. chrysanthemifolia** Nutt. Not uncommon in shady places from Santa Barbara to San Diego. May-June.

3. PHACELIA.

Annual or perennial mostly hirsute or hispid herbs with entire or lobed or dissected leaves and frequently showy flowers in scorpioid spikes or racemes; calyx deeply 5-parted; corolla blue, purple or white, rotate, campanulate, tubular or funnelform, the tube commonly with internal lamellate appendages; style 2-cleft; capsule 1-celled.

Ovules 4 (a pair to each placenta); seeds 4 or by abortion fewer.
  Corolla pale blue or whitish, tube of corolla with 10 appendages at base of stamens.
    Perennials.
      Leaves entire or with 1-2 pairs small lateral leaflets; filaments much exserted, sparsely bearded .... 1. *P. californica.*
      Leaves pinnately parted, the divisions toothed or incised.
        Stems hispid and glandular-hirsute, sepals obovate and abruptly narrowed at base. 2. *P. ramosissima.*
        Stems cinereous (not hispid); sepals lanceolate, spatulate .... 3. *P. cinerea.*

Annuals.
Plants 2 dm. high or less; leaves entire above, pinnatifid below .... 4. *P. humilis.*
Plants 3-8 dm. high (except 10).
Fruiting sepals narrow herbaceous, simple.
Leaves pinnately divided, lobes coarse; stems bristly with white hair.......... 5. *P. hispida.*
Leaves compound and finely dissected.
Stems with scattered hispid hairs and finely pubescent; sepals narrowly obovate .... 6. *P. distans.*
Stems hispid; sepals oblanceolate with rigid bristles .... 7. *P. tanacetifolia.*
Leaves oblong, pinnatifid with toothed lobes.
Style cleft to the middle; leaves crenate with lobes double toothed.............. 8. *P. integrifolia.*
Style cleft to below the middle; leaves narrow, oblong-pinnatifid; capsule short pediceled .... 9. *P. crenulata.*
Fruiting sepals 3-5-parted; herbage soft pubescent ....10. *P. floribunda.*
Fruiting sepals large, chartaceous, ciliate with rigid bristles; plant decumbent........11. *P. ciliata.*
Ovules and seeds numerous; annuals.
Appendages absent; plants viscid above.
Corolla 10-20 mm. broad, deep blue with purple or whitish center.....................12. *P. viscida.*
Corolla 2.5 cm. broad, purplish or pale blue......13. *P. grandiflora.*
Appendages 5 of small truncate or emarginate scales.
Corolla tube more than twice the length of the calyx lobes.
Corolla purple, 2.5 cm. long; appendages hairy; leaves ovate, toothed..................14. *P. Whitlavia.*
Corolla purplish or blue, 12 mm. long; appendages glabrous; leaves subcordate, dentate ....15. *P. campanularia.*
Corolla less than twice the length of the calyx lobes.
Corolla violet with 5 yellow spots in throat, 16 mm. long; filaments bearded; lower leaves pinnatifid ....16. *P. Parryi.*
Corolla white 12 mm. long; leaves ovate-subcordate, coarsely lobed................17. *P. longipes.*
Appendages of 10 vertical, salient lamellae.
Seeds reticulated and pitted.
Flowers very short pedicelled; plants erect, viscid, pubescent.
Leaves oblong, few toothed, short petioled; corolla purple, small..................18. *P. mohavensis.*
Leaves pinnately divided, lobes crenate; corolla 6 mm. long, whitish; plant 3-6 dm. high.............................19. *P. Lyoni.*

Leaves simply pinnatifid, lobes few toothed; corolla white; plant 3-6 dm. high.......20. *P. brachyloba.*

Flowers long pedicelled; plants low, decumbent, pubescent or hirsute.

Leaves pinnatifid, lobes entire; corolla light blue, twice the length of the calyx.....21. *P. Douglasii.*

Leaves lanceolate, entire or with lateral lobes; corolla purple, tube yellowish; calyx villous; pedicels recurved................22. *P. Davidsonii.*

Leaves ovate or lanceolate; corolla 6 mm. long; calyx hispid; pedicels recurved..:23. *P. curvipes.*

Flowers short pedicelled.

Leaves lanceolate with few acute lobes; flowers pale blue, about twice the length of the calyx.........................24. *P. Lemmoni.*

Flowers subsessile; appendages obscure or none.

Leaves roundish or obovate, entire or crenate toothed; corolla 8 mm. long, blue; plant viscid-puberulent ....25. *P. Parishii.*

Ovules and seeds numerous, oblong and corrugated transversely.

Corolla scarcely exceding calyx lobes.

Corolla blue; leaves membranaceous pinnatifid; petioles margined ....26. *P. micrantha.*

Corolla white; leaves hirsute-pubescent pinnate; style hairy below.....................27. *P. Ivesiana.*

Corolla blue; leaves roundish, repand or entire, 2.5-5 cm. in diameter..................28. *P. pachyphylla.*

Corolla much longer than the calyx lobes, lobes purple, tube yellowish.

Corolla twice the length of the calyx; leaves pinnatifid, the divisions lobed; capsule short pedicelled ....29. *P. Fremontii.*

Corolla thrice the length of the calyx; leaves pinnate, the divisions pinnatifid; capsule [illegible] .... [illegible]

1. **P. californica** Cham. A northern species.

Var. *imbricata* Jepson. Sepals ovate, imbricate. San Bernardino and San Jacinto Mts. July-August.

Var. *bernardina* Macbr. Sepals ovate, stems 3 dm. or more. The common form in all our mountains.

Var. *Ballii* Macbr. Subalpine form. Mountains of Los Angeles; Ventura and San Diego Co's.

2. **P. ramosissima** Dougl. A northern species.

Var. *suffrutescens* Parry. Sepals abruptly narrowed to a claw-like base, obovate and closely approximate. Common in the chaparral and pine belts. June.

Var. *subsinuata* Macbr. Stems essentially smooth, except for a more or less hispid pubescence. Common on the sea coast from Santa Barbara to San Diego. May-June.

3. **P. cinerea** Eastw. San Nicholas Island, only locality. April.

4. **P. humilis lobata** Davidson. Head of Rock Creek, type locality; Mt. San Gorgonio. July.

5. **P. hispida** Gray. Common in open places in the foothills. May-June.

Var. *Hubbyi* Macbr. Calyces and upper portion of stems shaggy-hirsute; fruiting racemes very dense even at base. Ojai Valley, type locality; Hollywood hills. May-June.

6. **P. distans** Benth. Very common on foothills and plains.

Var. *australis* Brand. Mohave Desert from Barstow to Needles.

7. **P. tanacetifolia** Benth. Cahuenga Pass; Playa Del Rey, *Hasse*. June.

8. **P. integrifolia** Torr. Colorado Desert. May.

9. **P. crenulata** Torr. Colorado Desert. May.

10. **P. floribunda** Greene. San Clemente Island.

11. **P. ciliata** Benth. Grassy foothills in the neighborhood of Los Angeles; Gorman Station; Capistrano, *Abrams;* apparently local. March-May.

12. **P. viscida** Torr. Along the coast range from Santa Barbara to Los Angeles Co.

Var. *albiflora* Gray. Differs only in having a white flower.

13. **P. grandiflora** Gray. Ranges with the last.

14. **P. Whitlavia** Gray. California Blue Bell. On low hills and burned areas from San Bernardino to San Diego. The proper name of this species is *P. minor* var. *Whitlavia* according to *Macbride*.

15. **P. campanularia** Gray. Rubio Canyon, *Hasse;* San Diego Co.

16. **P. Parryi** Torr. Occasional in the foothills of Los Angeles Co.; not uncommon in Ventura, Orange and San Diego Co's.

17. **P. longipes** Torr. Occasional on shaly slopes in the San Gabriel and Santa Ana mountains; Santa Barbara Co. June.

18. **P. mohavensis** Gray. Common in the Mohave Desert north to Inyo Co. June-July.

Var. *exilis* Gray. A slender form with linear leaves and corolla 6 mm. long. Mountains of Los Angeles and San Bernardino Co's.; Bear Valley, type locality.

19. **P. Lyoni** Gray. Santa Catalina, type locality.

20. **P. brachyloba** Gray. Upper chaparral belt from Santa Barbara to San Diego, not common.

21. **P. Douglasii** Torr. In a few subalkaline places on the plains of Los Angeles and Orange Co's.

22. **P. Davidsonii** Gray. In the pine belt in the mountains of Los Angeles and San Bernardino Co's. June-July.

Var. *micrantha* Parish. Leaves deeply pinnatifid, flowers larger. Ranging with the type.

23. **P. curvipes** Torr. San Antonio Mts.; mountains of San Diego Co.

24. **P. Lemmonii** Gray. Rock Creek.

25. **P. Parishii** Gray. Rabbit Springs, Mohave Desert, type locality.

26. **P. micrantha** Torr. Southeast borders of the Colorado Desert.

27. **P. Ivesiana** Torr. Colorado Desert.

28. **P. pachyphylla** Gray. Mohave Desert.

29. **P. Fremonti** Torr. Mt. Wilson; Santiago Peak; common on the Mohave Desert. May.

30. **P. bicolor** Torr. Common on the Mohave Desert. May-June.

4. EMMENANTHE. Whispering Bells.

Erect annual with the habit of *Phacelia,* differing from that genus only by its bright yellow persistent corolla, destitute of appendages.

1. **E. penduliflora** Benth. Common in the chaparral belt, especially after brush fires. March-June.

5. TRICARDIA.

A low perennial with alternate, entire, lanceolate leaves tapering to a margined petiole; flowers small, purplish, in loose racemes; pedicels recurved in fruit, the 3 exterior sepals much enlarged in fruit, ovate, cordate, nearly 2 cm. broad; appendages 10; style 2-cleft; ovary 2-celled, ovules 8.

1. **T. Watsoni** Torr. Colorado Desert; Haiwee, Kern Co., and probably in the Mohave Desert. May.

6. HESPEROCHIRON.

Dwarf stemless perennial with oblong entire leaves on margined petioles, and from their axils naked 1-flowered scapes of about the same length, bearing a solitary purplish or white flower, calyx 5-7 parted; corolla campanulate, deciduous; capsule 1-celled, 15-20 seeded.

1. **H. californicus** Wats. Moist ground, Bear Valley. July.

7. LEMMONIA.

Depressed desert annual with the general habits and structure of *Nama;* ovules 2 in each cell.

1. **L. californica** Gray. Near the source of the Mohave. May.

8. NAMA.

Mostly low depressed, pubescent herbs of the arid regions with purple or blue terminal or lateral flowers; calyx deeply 5-cleft; corolla funnelform or salverform; styles 2, cleft to the base; seeds numerous.

Annual, leaves entire.

Cauline leaves all sessile, the upper clasping at the base.

Corolla funnelform, little longer than the linear spatulate sepals; appendages free for one-third their length..................

Cauline leaves tapering to the base, not clasping. 1. *N. humifusum.*

Corolla purple, funnelform, nearly 2 cm. long, twice as long as the calyx. Pedicels of lower flowers equalling the calyx; leaves broadly spatulate, the upper ones sessile; plant hispid...................... 2. *N. hispidum.*

Pedicels sessile or subsessile; leaves linear-spatulate, all petioled; plant pubescent.. 3. *N. demissum.*

Corolla 4 mm. long or less; low, depressed, pubescent plants.

Corolla purplish, 4 mm. long; leaves spatulate-lanceolate .... 4. *N. depressum.*

Corolla light rose-color, 3 mm. long; leaves obovate .... 5. *N. pusillum.*

Perennial.

Leaves sessile, pinnatifid or sinuate-dentate; plant erect, viscid-pubescent .... 6. *N. Rothrockii.*

1. **N. humifusum** Brand. Colorado Desert.

2. **N. hispidum** Gray. Colorado Desert. May.

3. **N. demissum** Gray. Colorado and Mohave Deserts; occasional in the San Gabriel Mts., *Abrams.*

4. **N. depressum** Lemmon. Mohave Desert.

5. **N. pusillum** Lemmon. Frequent in the Mohave Desert. May.

6. **N. Rothrockii** Gray. Locally abundant on a dry ridge between Holcomb Valley and Greenlead, *Parish.* July.

9. TURRICULA.

Viscid pubescent strong-scented perennial with lanceolate, undulate, dentate, short-petioled leaves; flowers sessile in loose paniculate cymes, somewhat tubular, 15 mm. long, blue; stamens naked, included; capsule submembranous; seeds minutely striate longitudinally. *(Nama.)*

1. **T. Parryi** Gray. Somewhat rare and local in the Transition Zone of the San Gabriel, San Bernardino and San Jacinto Mts. June-August.

10. ERIODICTYON.

Low balsamic shrubs with alternately veined and finely reticulated leaves of firm or coriaceous texture, their margins toothed, at base tapering to a petiole; flowers in scorpoid cymes; calyx deeply 5-parted, the segments not dilated above; corolla pale blue or white; styles 2, distinct to the base; capsule globose, 2-celled, 4-valved, seeds few.

Leaves glutinous, glabrous or nearly so above....... 1. *E. trichocalyx.*
Leaves tomentose above, more or less densely tomentose beneath.
  Corolla 8-12 mm. long, much exceeding calyx...... 2. *E. crassifolia.*
  Corolla 2-3 mm. long, scarcely exceeding calyx..... 3. *E. Traskiae.*

1. **E. trichocalyx** Heller. Yerba Santa. Occasional in the chaparral belt in all our mountains. May-July.

2. **E. crassifolia** Benth. Ranges with the last. Very variable in the character of the pubescence. May-June.

3. **E. Traskiae** Eastwd. Santa Ynez Mts., *Abrams;* Catalina Island, type locality. May-June.

6. HELIOTROPACEAE.

Low annuals or perennial herbs; leaves alternate, exstipulate, entire; flowers perfect, mostly in helicoid cymes; calyx of 5 partially united sepals; corolla gamopetalous, funnelform to salverform, 5-lobed; stamens 5, adnate to the corolla; ovary 2-4-celled; styles united; stigma annular, surmounted by a 2-lobed appendage; fruit drupaceous or separating into 2 or 4 nutlets.

Fruit of 2 nutlets; flowers large, axillary to leaf-like bracts, appearing as if truly axillary. 1. Euploca.
Fruit of 4 nutlets; flowers small, in terminal helicoid cymes .... 2. Heliotropium.

1. EUPLOCA.

Spreading strigose annual with entire ovate-lanceolate leaves and conspicuous white flowers in the axils of leaflike bracts;

calyx lobes narrow; corolla salverform, with a limb 1-2 cm. wide, strongly plicate; stamens included, the anthers cohering by their minutely bearded tips; ovary 4-celled; fruit of 2 1-seeded nutlets. *(Heliotropium.)*

1. **E. convolulacea** Nutt. Mohave Desert.

2. HELIOTROPIUM.

Annual or perennial herbs with narrow leaves and small white flowers; corolla narrowly funnelform; ovary 4-celled; fruit of 4 1-seeded nutlets.

1. **H. spathulatum** Rydb. H. Curassavicum Hook. Common in moist subsaline soils. June-Nov.

7. BORAGINACEAE. Borage Family.

Annual or perennial herbs with simple, alternate, exstipulate leaves and flowers in unilateral or scorpoid cymes; flowers perfect, usually regular; calyx 5-cleft or parted, mostly persistent; corolla deciduous, mostly salverform; stamens 5, adnate to the corolla tube; style single; ovary deeply 4-lobed, in fruit 2 or 4 seed-like nutlets.

Style 2-parted.
  Fruit deeply 4-parted; prostrate annuals.......... 1. Coldenia.
Style entire.
  Ovary 4-lobed, in fruit splitting into 4 nutlets.
    Nutlets with hooked prickles on the margin.... 2. Lappula.
    Nutlets unarmed, or if prickly the prickles not hooked.
      Annuals.
        Flowers white.
          Nutlets flattish, divergent, wing margins bristly, at least at the apex............ 3. Pectocarya.
          Nutlets attached at the base; lowest leaves opposite .... 4. Allocarya.
          Nutlets attached by the middle.
            Roots imparting a purple stain......... 5. Plagiobothyrs.
            Roots not imparting a purple stain...... 6. Piptocalyx.
          Nutlets attached from the base to or above the middle.
            Plants mostly bristly-hispid; roots without coloring matter .... 7. Cryptantha.
            Plants not bristly-hispid; roots with purple coloring matter............... 8. Eremocarya.
        Flowers yellow or orange.................. 9. Amsinckia.
      Perennials; flowers white or yellow...........10. Oreocarya.

1. COLDENIA.

Ours prostrate, canescent or hispid annuals with small, ovate or obovate, entire, strongly veined leaves and small white or bluish flowers clustered in the axils; calyx 5-parted; corolla short-funnelform, slightly exceeding the calyx; stamens included; styles 2-cleft; fruit deeply 4-lobed.

Leaves rhomboid-rotund, margins revolute; calyx lobes equalling corolla tube............ 1. *C. Nuttallii.*
Leaves ovate; calyx lobes half as long as the corolla. 2. *C. Palmeri.*

1. **C. Nuttallii** Hook. Mohave and Colorado Deserts. May.

2. **C. Palmeri** Gray. Mohave and Colorado Deserts. May.

2. LAPPULA. Stickseed.

Hispid annuals or perennials with alternate leaves and small white or blue flowers in spikes or racemes; calyx 5-lobed; corolla salverform or funnelform, with a short tube; stamens included; fruit bur-like of 4 nutlets armed on the back or margins with barbed prickles.

Nutlets bristly or margins with a double row of bristles .... 1. *L. lappula.*
Nutlets sharply tuberculed, margins with a single row of bristles .... 2. *L. occidentalis.*

1. **L. lappula** Karst. Streets of Santa Monica, 1905.

2. **L. occidentalis** Greene. Common in dry meadows at Bear Valley. July-August.

3. PECTOCARYA.

Low, slender annuals with strigose-hirsute or canescent pubescence, narrow linear leaves and small white flowers scattered along the stems on very short and sometimes recurved pedicels; nutlets flattish, depressed and lacinate-bordered or pectinately setose around the margin, the bristles or prickles simply uncinate at the tip.

Nutlets with hooked bristles only at the apex........ 1. *P. pencillata.*
Nutlets with hooked bristles on the margins.
  Nutlets 4 mm. long, oblong...................... 2. *P. linearis.*
  Nutlets 1 mm. long, rounded.................... 3. *P. setosa.*

1. **P. pencillata** DC. Common in sandy soils in the foothills.

2. **P. linearis** DC. The more frequent form in the interior and on the deserts.

3. **P. setosa** Gray. Frequent on the deserts and the adjacent mountains.

4. ALLOCARYA.

Low, green, more or less hirsute annuals of moist habitat, linear entire leaves, the lowest opposite and connate perfoliate; flowers small on thickened pedicels in slender racemes; calyx persistent; corolla salverform with short tube, yellow throat and white limb; nutlets attached by an infra-medial or basal concave or raised scar.

Scar deeply excavate, half as long as the nutlet.
Nutlets armed with barbed bristles on the back.
Nutlets rugulose, reticulate on the back.......... 1. *A. echinacea.*
Nutlets granular, not rugulose or reticulate.... 2. *A. Greenei.*
Scar not deeply excavate; nutlets basally attached.
Nutlets with bristles barbed at the tip; corolla 1 mm. broad .... 3. *A. divergens.*
Scar attachment supra-basal.
Nutlets armed with bristles; corolla 1-2 mm. broad. 4. *A. hispidula.*
Nutlets unarmed; corolla 4-5 mm. broad; racemes bracted .... 5. *A. Cooperi.*

1. **A. echinacea** Piper. San Diego; University Heights, type locality.

2. **A. Greenei** Gray. San Diego, *Piper.*

3. **A. divergens** Piper. San Diego; Elsinore, *Piper.*

4. **A. hispidula** Greene. San Bernardino Mts., Bear Valley, type locality.

5. **A. Cooperi** Greene. Mohave Desert, type locality.

5. PLAGIOBOTHRYS. Pop-corn Flower.

Slender annuals with soft pubescence, usually imparting a purple stain; racemes naked or leafy; pedicels very short, filiform, persistent; calyx 5-parted, closed or campanulate, more or less accrescent in fruit; nutlets ovate or indistinctly cruciform in outline, carinate on both sides towards the apex, usually with well defined lateral margins, the back smooth or roughened; insertion almost medial; scar rounded, hollow, or solid, not rarely stipitate.

Fruit not stipitate.
Calyx divided to near the base.
Mature nutlets cruciform, shining.
Spikes few-flowered; nutlets 2 mm. long...... 1. *P. tenellus.*
Spikes floriferous; nutlets less than 2 mm. long. 2. *P. asper.*
Mature nutlets opaque, rugose.
Herbage hirsute or hispid with widely spreading hairs .... 3. *P. arizonicus.*
Herbage villous pubescent.................... 4. *P. canescens.*
Calyx cleft only to the middle, silky-villous........ 5. *P. nothofulvus.*
Fruit stipitate.
Corolla hardly exceeding calyx; plant hirsute, low, tufted and very leafy.................. 6. *P. ursinus.*
Corolla limb 4-6 mm. broad; plant erect, hispidulous .... 7. *P. Cooperi.*

1. **P. tenellus** Gray. Southern California, acc. to *Synopt. Flora.*

2. **P. asper** Greene. Little Bear Valley, *Parish.*

3. **P. arizonicus** Greene. Southeastern borders of California. Var. *catalinensis* Gray. Calyx lobes broader and somewhat accrescent; nutlets duller and rougher. Catalina Island.

4. **P. canescens** Benth. Frequent on grassy foothills and mesas.

5. **P. nothofulvus** Gray. With the last.

6. **P. ursinus** Gray. Frequent in Bear Valley, type locality.

7. **P. Cooperi** Gray. Occasional in the coast valleys, *Abrams;* San Diego to San Bernardino in the foothills.

6. PIPTOCALYX.

Hispid-canescent, low, diffusely branched and glomerate annuals; calyx villous-hispid, circumscissile near the middle, its lower part with the very short pedicel persistent; nutlets 4, not keeled, distinctly margined, rough or smooth.

1. **P. circumscissus** Torr. Mountains and interior valleys from San Bernardino to San Diego.

7. CRYPTANTHA.

Low branched rough-hispid or canescent annuals or perennials with narrow leaves and small flowers in terminal spikes or racemes; calyx closely embracing the fruit and deciduous with it, the attenuate and elongated tips sometimes spreading above it; corolla white, salverform or funnelform; nutlets 4, or by abortion fewer, smooth or tuberculate, attached laterally almost to the apex, the margins sometimes acute or even winged.

Fruiting calyx closed, deciduous, its segments narrow, hispid.
  Nutlets muriculate.
    Nutlets 1 only or 1 larger and less roughened... 1. *C. angustifolia.*
    Nutlets 4, all alike.
      Calyx lobes equalling or little exceeding the nutlets in fruit.
        Corolla 4-6 mm. broad.
          Plant 2-4 dm. high, hispid; stems divergent .... 2. *C. muriculata.*
          Plant 2 dm. high, densely hispid; calyces 2-ranked .... 3. *C. horridula.*
        Corolla 2 mm. broad...................... 4. *C. racemosa.*
      Calyx lobes about twice the length of the nutlets.
        Nutlets strongly muricate, gray.
          Corolla about 6 mm. broad; sepals 6-8 mm. long in fruit......................... 5. *C. barbigera.*

Corolla less than 4 mm. broad; sepals 3-5 mm. long .... 6. *C. intermedia.*
Nutlets faintly and sparsely muricate, brown 7. *C. ambigua.*
Nutlets smooth and shining.
Nutlets 1 or 2, the others abortive.
Fruiting calyx adpressed to the stem.
Plant pubescent, calyx hispid; corolla 2 mm. broad .... 8. *C. flaccida.*
Fruiting calyx not adpressed to the stem.
Nutlets conspicuously acuminate, ventral groove forked; corolla 1 mm. broad..... 9. *C. macrostachys,*
Nutlets ovate, ventral groove hardly at all forked ....10. *C. ramosissima.*
Nutlets 4 ....11. *C. leiocarpa.*
Fruiting calyx persistent, spreading, the segments broad and less bristly.
Nutlets acutely angled.
Nutlets rough ....12. *C. oxygona.*
Nutlets smooth ....13. *C. mohavensis.*
Nutlets broadly winged........................14. *C. cycloptera.*

1. **C. angustifolia** Greene. Colorado Desert.

2. **C. muriculata** Greene. Frequent in the pine belt.

3. **C. horridula** Greene. Summit of the dividing ridge between San Bernardino and the Mohave Desert.

4. **C. racemosa** Greene. Frequent at Palm Springs and on the Colorado Desert.

5. **C. barbigera** Greene. Common in the foothills and in the arid interior.

6. **C. intermedia** Greene. Very common on open hillsides.

7. **C. ambigua** Greene. Occasional in the foothills and pine belt.

8. **C. flaccida** Greene. Chatsworth Park, *Abrams.*

9. **C. microstachys** Greene. Frequent in the canyons of the foothills.

10. **C. ramosissima** Greene. South Eastern California and the Mohave Desert.

11. **C. leiocarpa** Greene. On the sand dunes along the coast.

12. **C. oxygona** Greene. Hills bordering the Mohave Desert.

13. **C. mohavensis** Greene. Mohave Desert.

14. **C. cycloptera** Greene. Palm Springs and the Colorado Desert.

8. EREMOCARYA.

Hirsute canescent small annual herbs with leaves all in a basal rosulate tuft and the numerous racemose branches repeatedly dichotomously and conspicuously leafy-bracted; pedicels filiform short; calyx 5-parted to the base the segments nerveless, not bristly, persistent; nutlets neither margined nor keeled, attached for their whole length.

Corolla lobes 1 mm. long; throat appendages obscure; nutlets smooth .... 1. *E. micrantha.*
Corolla 2 mm. long; throat appendages conspicuous; nutlets pectinate-scabrous .... 2. *E. lepida.*

1. **E. micrantha** Greene. Common in dry washes. May-July.

2. **E. lepida** Greene. Frequent on the Colorado Desert, the San Bernardino and San Diego Mts. May-June.

9. AMSINCKIA.

Rough hispid annuals with scorpoid, spicate, yellow flowers; sepals herbaceous, 5 or 4; corolla slender with open throat; filaments short; style filiform; nutlets crustaceous, triquetrous, smooth or rough.

Nutlets at maturity very smooth and polished....... 1. *A. vernicosa.*
Nutlets more or less roughened.
Nutlets tessellate or tessellate-rugose.
Corolla 10 mm. long.......................... 2. *A. tessellata.*
Nutlets roughened but not tessellate.
Leaves slightly denticulate.
Racemes bracted throughout.................. 3. *A. St. Nicolai.*
Racemes not bracted or the lower flowers only.
Foliage sparsely hispid; nutlets dark brown, indistinctly rugulose, sharply muricate.. 4. *A. intermedia.*
Foliage hispid and hirsute; nutlets paler, distinctly rugulose .... 5. *A. Douglasiana.*
Leaves entire.
Corolla 5-6 mm. long, tube little if at all exserted .... 6. *A. parviflora.*
Corolla 10 mm. long; nutlets prickly.......... 7. *A. echinata.*
Corolla about 15 mm. long, 2 or 3 times as long as the calyx.
Calyx bristly with spreading hairs.......... 8. *A. Eastwoodae.*
Calyx villous with adpressed hairs......... 9. *A. microcarpa.*

1. **A. vernicosa** H.&A. Calico, San Bernardino Co., *Macbride.*

2. **A. tessellata** Gray. Frequent on the Mojave Desert, north to Inyo Co.

3. **A. St. Nicolai** Eastw. Seashore at San Nicolas Island.

4. **A. intermedia** F.&M. Not common and limited to the coastal slope from San Diego to San Pedro.

5. **A. Douglasiana** ADC. (A. spectabilis F.&M.) A very common weed in grain fields and on waysides.

6. **A. parviflora** Heller. Red Hills, Upland, *Johnston.*

7. **A. echinata** Gray. Rare and local at Fort Mohave.

8. **A. Eastwoodae** Macbr. Red Hills, Upland, *Johnston.*

9. **A. microcarpa** Greene. Fort Mohave.

10. OREOCARYA.

Coarse rough-hispid biennials or perennials with white or yellow flowers in crowded paniculate or thyrsoid clusters; calyx deeply 5-parted, open in fruit, persistent; corolla salverform, the tube usually but little surpassing the calyx, the throat crested; stamens included; ovary deeply 4-lobed, the nutlets sharply angled or wing-margined, laterally attached.

Corolla yellowish, tube much exserted; nutlets 4, ovate-trigonous .... 1. *O. confertiflora.*
Corolla white, tube not exserted; nutlets solitary (3 of the ovaries abortive)............... 2. *O. abortiva.*

1. **O. confertiflora** Greene. Dry hillsides in the pinon zone, San Bernardino Mts., Cushenberry Canyon, type locality, *Parish.*

2. **O. abortiva** Greene. Frequent in dry meadows Bear Valley, type locality.

8. VERBENACEAE. Vervain Family.

Ours, herbs with opposite leaves and flowers in bracted, more or less elongated spikes; calyx limb 2-5-lobed; corolla bilabiate or somewhat irregular; stamens didynamous; style single; stigmas 1 or 2; ovary 2-4-celled; fruit separating at maturity into 2-4 nutlets.

Fruit of 4 nutlets.............................. 1. Verbena.
Fruit of 2 nutlets.............................. 2. Lippia.

1. VERBENA. Vervain.

Ours, annual or perennial herbs, erect or prostrate, with simple or palmately lobed leaves and terminal spikes of blue or purplish flowers with unequal lobes; stamens 4, sometimes glandular appendaged; fruit of 4 nutlets.

Anthers not glandular-appendaged; flowers small, in elongated spikes.
Bracts inconspicuous or shorter than the calyx.
Annual; leaves 1-2-pinnately incised............. 1. *V. officinalis.*
Perennial.
Leaves almost glabrous, oblong-lanceolate, serrate or sparingly incised; spike slender, flowers scattered .... 2. *V. urticaefolia.*
Leaves hirsute or hispid, narrowing to the base or sessile, blades deeply serrate and somewhat lobed; flowers scattered...... 3. *V. polystachya.*

Leaves soft-villous, obovate or oblong with cuneate base, blades serrate, occasionally cleft; flowers spike dense.............. 4. *V. prostrata.*
Bracts leaf-like, much longer than the calyx; leaves hirsute cuneate-oblong, incised and serrate .... 5. *V. bracteosa.*
Anthers glandular-appendaged; flowers in depressed spikes; corolla showy.
Leaves hirsute-pubescent, deeply cleft or pinnately divided into narrow segments.......... 6. *V. Wrightii.*

1. **V. officinalis** L. San Diego, 1884.

2. **V. urticaefolia** L. Occasional in marshy places in the neighborhood of Los Angeles. May-August.

3. **V. polystachya** H.B.K. In marshy and moist places in foothills of the San Gabriel and San Bernardino Mts. May-August.

4. **V. prostrata** R. Br. Common on the plains and foothills throughout our range. May-August.

5. **V. bracteosa** Michx. Edges of dried up pools, Los Angeles and San Bernardino. June-July.

6. **V. Wrightii** Gray. Railway track near Monrovia. 1902.

2. LIPPIA.

Ours, low riparian herbs bearing axillary, peduncled and bracted capitate spikes of small light blue flowers in character much like those of *Verbena;* fruit of 2 one-seeded nutlets.

1. **L. lanceolata** Michx. Occasional along slow-running streams, Los Angeles; San Bernardino. June-August.

9. MENTHACEAE. Mint Family.

Herbs and shrubs mostly aromatic, with quadrangular stems, opposite simple exstipulate leaves and axillary solitary or cymose-congested flowers, but the inflorescence often more terminal and spicate; calyx 3-5-toothed or cleft, regular or bilabiate; corolla usually strongly bilabiate, upper lip entire or 2-lobed, lower 3-cleft or parted; stamens 2 or 4; ovary 3-lobed becoming a seed-like nutlet. *(Labiatae.)*

Flowers 1 or 2 in the axils.
Calyx gibbous on the back........................14. Scutellaria.
Calyx not gibbous on the back.
Corolla purple; fruit bladdery, inflated; spinescent shrub ....15. Salzaria.
Corolla purplish, 2.5 cm long................ .. undershrub ....10. Sphacele.
Corolla pale-blue, irregularly 5-cleft; erect herb..19. Teucrium.

Corolla white 8 mm. long; trailing herb.......... 5. Micromeria.
Corolla orange 2.5 cm. long, strongly bilabiate... 6. Calamintha.
Flowers not solitary.
Calyx and corolla nearly regular.
Stamens 4, long exserted, curved...............20. Trichostema.
Stamens 4, short, nearly equal.................. 2. Mentha.
Stamens 4, upper lip of corolla 4-lobed.......... 1. Hyptis.
Stamens 2 .... 3. Lycopus.
Calyx regular; corolla pronouncedly but not strongly bilabiate ....
Flowers densely glomerate terminally and in the upper axils .... 4. Koellia.
Flowers in a simple terminal head............. 7. Monardella.
Calyx regular; corolla strongly bilabiate.
Stamens included in the corolla tube...........17. Marrubium.
Stamens exceeding the corolla tube.............18. Stachys.
Calyx and corolla bilabiate, the latter strongly so.
Flower whorls very crowded.
Upper calyx lip truncate, 3-toothed...........16. Prunella.
Calyx oblique, slightly 2-lipped................13. Agastache.
Calyx oblique, teeth subequal................11. Nepeta.
Calyx unequally 5-toothed...................12. Clecoma.
Calyx unequally 5-toothed, strongly ciliate.... 8. Pogogyne.
Flower whorls more remote.
Corolla white, subtended by prickly margined bracts .... 9. Acanthomintha.
Upper corolla lip erect; filaments short; the connective transverse, the lower portion evident ....21. Salvia.
Upper corolla lip spreading; connective nearly continuous with the filament, the lower portion not evident or indicated by a tooth ....22. Ramona.

1. HYPTIS.

A low, scurfy canescent shrub with ovate, crenate, petioled leaves and small flowers in short peduncled axillary clusters; calyx white-woolly nearly equally 5-toothed; corolla violet, lower lobe saccate deflexed at base.

1. **H. Emoryi** Torr. Palm Springs and the borders of the Colorado Desert. April.

2. MENTHA. Mint.

Aromatic perennial herbs mostly spreading by creeping rootstocks, leaves toothed; flowers small, pink, clustered in the axils of the leaves or in whorls in terminal spikes; calyx nearly equally 5-toothed, 10-ribbed; corolla regular; stamens 4.

Whorls of flowers in interrupted spikes.
Leaves petioled, glabrous; spikes dense or little interrupted.
Leaves lanceolate or oblong, acute.............. 1. *M. piperita.*

Leaves ovate, obtuse, subcordate............... 2. *M. citrata.*
Leaves sessile or nearly so.
Plant glabrous; spikes slender, interrupted...... 3. *M. spicata.*
Plant canescent; leaves sessile, roundish, rugose. 4. *M. rotundifolia.*
Whorls of flowers all axillary.
Leaves villous-hoary, tapering to a short petiole.... 5. *M. canadensis.*
Leaves glabrous, short petioled.................. 6. *M. arvensis.*

1. **M. piperita** L. Peppermint. Banks of Los Angeles River. 1891.

2. **M. citrata** Ehrh. Well established at Town Creek, San Bernardino. *Parish.* 1903.

3. **M. spicata** L. Spearmint. Stream banks Los Angeles and Santa Ana. 1904.

4. **M. rotundifolia** L. Waterman Creek, San Bernardino; near Glendale. 1896.

5. **M. canadensis** L. Common along streams and marshes. July-September.

6. **M. arvensis glabrata** Fernald. Bluff Lake and streams in the San Bernardino Mts.

3. LYCOPUS. Water Hoarhound.

Perennial herbs stoloniferous at base with lanceolate, coarsely toothed or serrate, sessile leaves and small white flowers crowded in the axils; calyx 4-5-toothed; corolla 4-lobed; fertile stamens 2; nutlets triangular.

Leaves petioled, pinnatifid or deeply incised......... 1. *L. americanus.*
Leaves sessile, regularly serrate..................... 2. *L. lucidus.*

1. **L. americanus** Muhl. Occasional on stream borders at Los Angeles. August.

2. **L. lucidus** Turcx Occasional on stream banks, San Bernardino Valley, *Parish.*

4. KOELLIA. Mountain Mint.

Perennial herb with sessile, ovate, serrulate leaves and white flowers in densely crowded whorls subtended above by a pair of reduced leaves; calyx teeth equal; corolla tube scarcely exceeding the calyx, the upper lip entire, the lower 3-cleft; stamens 4. *(Pycnanthemum.)*

1. **K. californica** Kuntze. Generally distributed in mountain canyons, but not common. June-August.

5. MICROMERIA. YERBA BUENA.

Low trailing sweet-scented evergreen perennial with rounded and petioled thin veiny leaves and solitary white flowers in the axils; calyx 5-toothed; corolla with upper lip emarginate, lower 3-parted; stamens 4.

1. **M. Chamissonis** Greene. Rare on shady slopes of the Santa Monica Mts., more common in the coast ranges of Ventura and Santa Barbara. May-June.

6. CALAMINTHA. CALAMINT.

Perennial herb with coarsely serrate, villous, ovate, petioled leaves and large mimulus-like orange-colored flowers with long pedicels, few in the axils; upper lip of calyx 3-parted; corolla tube long, lower lip 3-lobed; stamens 4.

1. **C. mimuloides** Benth. Rare and local, near Oak Wild, Arroyo Seco; Pasadena; near Acton. July.

7. MONARDELLA.

Ours, annual or perennial aromatic herbs with commonly entire leaves and flowers crowded in terminal heads subtended by large particolored bracts; calyx 10-13-nerved, tubular, teeth nearly equal; corolla tube slender, lobes of the limb linear; stamens 4.

Flowers in rather loose heads; corolla tube much longer than the corolla lobes; perennial.
  Corolla scarlet or orange red.................... 1. *M. macrantha.*
  Corolla yellowish and rose-tinged................ 2. *M. nana.*
Flowers in dense heads; corolla tube little longer than the corolla lobes.
  Perennial.
    Leaves similar on both surfaces, flowers purplish or rose-colored.
      Leaves irregularly or remotely denticulate.
        Herbage cinereous, tomentose.............. 3. *M. cinerea.*
        Herbage villous-pubescent .... 4. *M. australis.*
      Leaves entire.
        Leaves bright green; filaments villous at base 5. *M. epilobioides.*
        Leaves sparsely puberulent, oil ducts numerous beneath .... 6. *M. viminea.*
        Leaves minutely puberulent, oil ducts few... 7. *M. linoides.*
        Leaves puberulent with adpressed retrorse hairs .... 8. *M. oblonga.*
  Leaves white tomentose beneath; flowers white.
    Leaves petioled, veins evident beneath.......... 9. *M. hypoleuca.*
    Leaves sessile or subsessile, veins not evident beneath ....10. *M. lanata.*
  Leaves undulate on margins; stems woolly-tomentose ....11. *M. crispa.*

Annual.
  Flowers purple or rose purple.
    Bracts broadly ovate, 10 mm. or more in length, not pubescent ....12. *M. lanceolata.*
    Bracts abruptly acuminate.
      Bracts and calyx teeth villous-pubescent.....13. *M. Pringlei.*
      Bracts scabrous; calyx teeth short-pubescent.14. *M. Elmeri.*
  Flowers white; bracts white with rose tinged margins ....15. *M. exilis.*

1. **M. macrantha** Gray. In the upper chaparral belt and pine woods of the San Bernardino and Cuyamaca Mts., the latter the type locality. Barley Flats, *Grinnell* and West Fork San Gabriel Mts. July. The species is very variable, especially as to pubescence. Var. *Hallii* Abrams has the herbage densely villous. Palomar mountains, type locality; Mill Creek Canyon, San Bernardino Co., *Parish.* Var. *longiloba* Abrams. Herbage glandular pubescent; corolla yellowish, tube slender. Chaparral belt, San Jacinto Mt., alt. 1,300 meters, type locality.

2. **M. nana** Gray. Cuyamaca Mts., *Abrams.*

Var. *leptosiphon* Abrams. Corolla lobes 7-10 mm. long; herbage villous. Palomar mountains in open pine woods; San Felipe, type locality.

Var. *tenuiflora* (Wats.) Abrams. Corolla yellow, lobes 6 mm. long. San Jacinto Mts.

Var. *arida* (Hall) Abrams. Desert slopes of the San Jacinto (type locality) and Santa Rosa Mts.

3. **M. cinerea** Abrams. Limited to Mt. San Antonio and Little Baldy, *Johnston.* July.

4. **M. australis** Abrams. Open forests of San Jacinto and San Bernardino Mts., at 1,800 to 2,800 meters, *Abrams* Tamarack Valley, type locality.

5. **M. epilobioides** Greene. Forests of the Canadian and Transition Zones San Bernardino Mts., Bear Valley, type locality, *Abrams.*

Var. *erecta* Abrams. Bracts herbaceous; throat of corolla villous below. Open forests of the San Bernardino and San Antonio Mts. July.

6. **M. viminea** Greene. Foothills of the coast mountains near San Diego.

7. **M. linoides** Gray. On the mountains bordering the Colorado and Mohave Deserts. July.

8. **M. oblonga** Greene. Mountains south of Tehachapi, type locality; Mt. Pinos, *Abrams.*

9. **M. hypoleuca** Gray. Mountain Drive, Santa Barbara, *Abrams;* Topango Canyon; San Juan Hot Springs.

10. **M. lanata** Abrams. Cuyamaca and southwards; Descanso Grade, type locality.

11. **M. crispa** Elmer. Surf, Santa Barbara, only locality.

12. **M. lanceolata** Gray. Common in the mountains at middle altitudes. June.

Var. *microcephala* Gray. Bracts about one-half the length of the type; calyx teeth without bristle-like hairs. Foothills of San Diego Co., July.

13. **M. Pringlei** Gray. Near Colton, San Bernardino Co., type and only locality. May-June.

14. **M. Elmeri** Abrams. Acton, only locality.

15. **M. exilis** Greene. Frequent on the Mohave Desert at and around Lancaster. May-June.

8. POGOGYNE.

Slender puberulent annual with glabrous entire, leaves and blue flowers 15 mm. long, in distant clusters; calyx deeply and unequally 5-cleft; corolla lips short, the upper entire, the lower 3-lobed; stamens 4; style bearded.

1. **P. nudiscula** Gray. Near San Diego, type locality.

9. ACANTHOMINTHA.

Low, leafy glabrous annual with cuneate, crenate-dentate, slender petioled, coriaceous leaves and white or rose-tinted flowers about 12 mm. long, clustered in the axils the subtending bracts bearing long slender prickles; calyx 13-nerved, upper lip 3-toothed; lower lip of the corolla 3-lobed; stamens 4.

1. **A. ilicifolia** Gray. Southern borders of San Diego Co., type locality.

10. SPHACELE.

Strong scented suffrutescent plants with ample ovate crenate leaves and large white or rose-colored flowers solitary in the axils; calyx campanulate; corolla tube broad, lobes 5, the lower longest; stamens 4, filaments naked.

1. **S. fragrans** Greene. Frequent on the Altadena Trail to Mt. Wilson; local in a few other places in the chaparral belt of the San Gabriel Mts.; Catalina. June.

11. NEPETA. Cat Mint.

Perennial herb with dentate incised leaves and pale purple flowers in verticillate clusters; calyx 15-nerved, teeth nearly equal; corolla strongly bilabiate; stamens 4.

1. **N. cataria** L. A rare casual, Beaumont, 1880.

12. CLECOMA. Ground Ivy.

A low creeping perennial with long petioled reniform, crenate leaves and blue, short pedicelled flowers, few in the axils; calyx 15-nerved, unequally toothed; corolla bilabiate; stamens 4.

1. **C. hederacea** L. Hoppers' Canyon, Ventura Co. 1890.

13. AGASTACHE. Giant Hyssop.

Tall perennial with ovate, serrate, petioled leaves and small violet-purple flowers crowded into terminal spikes; calyx 15-nerved, slightly bilabiate, 5-toothed; corolla strongly bilabiate; stamens 4. *(Lophanthus.)*

1. **A. urticifolia** Kuntze. Locally abundant at Oak Glen and Potato Canyon in the lower chaparral zone, San Bernardino Mts., *Parish.*

14. SCUTELLARIA. Skullcap.

Low perennial herbs with simple leaves and usually blue flowers opposite each other in the axils of the leaves; calyx gibbous on the back, lips entire; the apparent lower lip single, entire; stamens 4.

Leaves coarsely toothed, petioled; flowers dark blue, 15 mm. long; root tuberous........... 1. *S. tuberosa.*
Leaves entire, lowest short petioled, others sessile.
  Flowers 25 mm. long, violet-blue.
    Leaves linear 1-2 mm. wide..................... 2. *S. linearifolia.*
    Leaves more than 2 mm. wide.................. 3. *S. angustifolia.*
  Flowers 12 mm. long, whitish; leaves ovate, elliptical, base subcordate.................. 4. *S. Bolanderi.*

1. **S. tuberosa** Benth. Occasional on shady banks chiefly near the coast from Los Angeles to San Diego. April-May.

2. **S. linearifolia** Eastw. San Diego, type locality. June.

3. **S. angustifolia** Pursh. In the Transition Zone of all our mountains, very common at Idylwild. June-July.

4. **S. Bolanderi** Gray. San Jacinto Mt., at 1,800 meters; El Monte. July.

15. SALZARIA.

A low spinescent pale green shrub with small lanceolate entire short petioled leaves and purplish flowers; calyx not gibbous, lips entire becoming inflated and bladdery-like in fruit.

1. **S. mexicana** Torr. Common on the Mohave Desert. May.

16. PRUNELLA. Self-heal.

Simple or branching perennial herbs with lanceolate, crenate or entire and petioled leaves and purple flowers in densely bracted mostly terminal spikes; calyx 10-nerved, bilabiate; corolla upper lip entire, arched, lower lip 3-lobed; stamens 4.

1. **P. vulgaris** L. Becoming increasingly common in lawns at Los Angeles and Santa Monica.

Var. *lanceolata* Fernald. Wet meadows of the Transition Zone, San Bernardino Mts.

17. MARRUBIUM. Hoarhound.

A much branched woolly perennial with dentate rugose leaves and small white flowers in dense axillary clusters; calyx 5-10-nerved, teeth equal; corolla upper lip entire or emarginate, lower 3-lobed; stamens 4.

1. **M. vulgare** L. A very common pest, wholly occupying some soils with its dense growth. Native of Europe.

18. STACHYS. Woundwort. Hedge Nettle.

Perennial pubescent herbs with upright sharply quadrangular stems and white purple spotted or purple flowers in the axils of the leaves forming an interrupted, spicate inflorescence; calyx 5-10-nerved, teeth equal; upper lip of corolla erect, concave, entire or emarginate, lower lip 3-lobed; stamens 4.

Flowers whitish, corolla tube not exceeding the calyx.
  Whorls crowded; herbage white woolly............ 1. *S. albens.*
  Whorls distinct; herbage villous.................. 2. *S. adjugoides.*
Flowers purplish, corolla nearly twice the length of the calyx.
  Leaves oblong-ovate; hairy ring at middle of corolla tube oblique .... 3. *S. bullata.*
  Leaves subcordate; hairy ring near base of corolla tube horizontal .... 4. *S. californica.*

1. **S. albens** Gray. In wet soils ranging from the valleys to the Transition Zone. May-August.

2. **S. adjugoides** Benth. Playa del Rey. May.

3. **S. bullata** Benth. Generally distributed.

4. **S. californica** Benth. Common on brushy hills. April-June.

19. TEUCRIUM. Germander.

Low diffuse herb with obovate-cuneate, crenately incised and short petioled leaves below and cleft or incised leaves above; flowers solitary in the axils; calyx 10-nerved, teeth equal; corolla pale blue, hardly exceeding the calyx; stamens 4.

1. **T. cubense** L. Southeast California.

20. TRICHOSTEMA. Blue Curls.

Strong scented annual herbs or suffrutescent perennials with entire lanceolate leaves and blue or violet corolla and stamens; calyx teeth equal; corolla curved, limb equally 5-parted; stamens 4, filaments long, much exserted.

Annual; flowers axillary; stems leafy to the top.
  Leaves petioled; corolla very small, its tube not exceeding the calyx.................. 1. *T. micranthum.*
  Leaves sessile, larger; corolla 15 mm. long........ 2. *T. lanceolatum.*
Perennial; inflorescence terminal.
  Corolla tube well exserted beyond the calyx........ 3. *T. lanatum.*
  Corolla tube scarcely exserted beyond the calyx... 4. *T. Parishii.*

1. **T. micranthum** Gray. Frequent in the Transition Zone, San Bernardino Mts., Bear Valley, type locality. July.

2. **T. lanceolatum** Benth. Camphor Weed. A common aftermath of the grain fields clothing them in a sheet of blue. June-September.

3. **T. lanatum** Benth. Romero. Occasional on dry hillsides in the chaparral belt, from Los Angeles Co., to Santa Barbara.

4. **T. Parishii** Vasey. Occasional in the Transition Zone of the mountains of San Bernardino, Los Angeles and San Diego Counties. May-July.

21. SALVIA.

Ours annuals with pinnatifid leaves and blue flowers in crowded clusters; calyx bilabiate, upper lip 3-cleft or entire; corolla deeply bilabiate, its lower lip large, notched or obcordate; stamens 2, filaments apparently forked, the connective attached in part, one end bearing a fertile, the other a rudimentary, anther-cell.

Herbaceous.
  Flowers light blue, 25 mm. long, lobes erose or fimbriately cleft; leaves spinulose...... 1. *S. carduacea.*
  Flowers dark blue, 10 mm. long; leaves rugose, pinnatifid or incised.
    Bracts triangular, acute; leaves pinnatifid; flower stems bare. 2. *S. columbariae.*
    Bracts ovate, abruptly acuminate; leaves incised; flower stems leafy.................. 3. *S.* [illegible]
Shrubby, flowers ochroleucous; leaves spinose, pinnatifid, white tomentose on both surfaces .... 4. *S. funerea.*

1. **S. carduacea** Benth. Thistle-sage. Widely distributed in light soils and sometimes very abundant locally. March-May.

2. **S. columbariae** Benth. Chia. Very general in foothills and valleys. March-May.

3. **S. bernardina** Parish. Reche Canyon near San Bernardino. May. Presumed to be a hybrid between *Salvia columbariae* and *Ramona stachyoides.*

4. **S. funerea** Jones. Canyon Springs, Dos Palmas, Riverside Co., *Brandegee.*

22. RAMONA. Sage.

Herbs, shrubs or undershrubs with rugose veiny mostly crenate leaves and rather showy flowers; calyx bilabiate; corolla upper lip 2-lobed or emarginate, lower 3-lobed, middle lobe emarginate. *(Audibertia.)*

- Flowers in dense whorls.
  - Herbs.
    - Flowers crimson purple, 3-4 cm. long; leaves rugose, the lowest hastate.............. 1. *R. grandiflora.*
  - Shrubs or woody-based perennials; flowers purple to pale violet.
    - Bracts scarious-membranaceous, usually colored.
      - Leaves entire, not rugose.
        - Inflorescence villous-pubescent .... 2. *R. pilosa.*
        - Inflorescence puberulent .... 3. *R. pachystachya.*
      - Leaves crenulate rugose; heads solitary....... 4. *R. capitata.*
  - Bracts herbaceous, not colored; leaves rugose, crenate.
    - Bracts awned.
      - Bracts lanceolate, villous.................... 5. *R. humilis.*
      - Bracts oblong, glabrous, abruptly acuminate... 6. *R. stachyoides.*
      - Bracts oblong, long awned; leaves white on both sides .... 7. *R. Vaseyi.*
    - Bracts not awned.
      - Bracts broadly ovate, acuminate, viscid, white-pubescent .... 8. *R. Clevelandi.*
      - Bracts ovate, apex blunt; whole plant hoary-white .... 9. *R. nivea.*
- Flowers not in dense heads, (thyrsoid-paniculate).....10. *R. polystachya.*

1. **R. grandiflora** Briquet. Shady slopes of the Santa Monica hills; coast canyons Orange Co. March-May.

2. **R. pilosa** Gray. Not infrequent on the mountains bordering the Mohave Desert, south and west. April-May.

3. **R. pachystachya** Heller. Transition Zone of the San Jacinto and San Bernardino Mts., Bear Valley, type locality. April-May.

4. **R. capitata** Briquet. Summit of Providence Mt., type and only locality.

5. **R. humilis** Greene. Cuyamaca Mts., *Abrams.*

6. **R. stachyoides** Briquet. Black Sage. A very common foothill shrub. April-June.

7. **R. Vaseyi** Briquet. Borders of the Colorado Desert. April.

8. **R. Clevelandi** Briquet. Frequent in western San Diego Co., the type locality. A very sweet scented shrub retaining its fragrance for years in the herbarium. May.

9. **R. nivea** Briquet. A common foothill shrub from Santa Barbara to the borders of Los Angeles Co., near Calabasas; less common at Newhall and in the Santa Monica and Santa Ana Mts. May-June.

10. **R. polystachya** Greene. White Sage. Common and widely distributed. May-June.

R. polystachya X *R. stachyoides.* A frequent hybrid on the foothills around Glendale and Lincoln Park, Los Angeles Co.

10. SOLANACEAE. Potato Family.

Annual or perennial herbs or shrubs with alternate, exstipulate leaves and regular 5-merous flowers; style and stigma single; ovary 2-celled and many ovuled with a central placenta; fruit a berry or capsule

- Fruit a capsule.
  - Capsule large, spiny; flowers large, showy........ 1. Datura.
  - Capsule not spiny.
    - Sepals united; flowers racemose, white or yellow. 2. Nicotiana.
    - Sepals nearly distinct; flowers solitary, purplish red .... 3. Petunia.
- Fruit a berry.
  - Shrubs, spinescent; corolla small, tubular or funnelform .... 4. Lycium.
  - Herbs.
    - Fruiting calyx bladdery and inflated........... 5. Physalis.
    - Fruiting calyx not inflated; flowers rotate....... 6. Solanum.

1. DATURA. Thorn-apple.

Rank, ill-smelling annual or perennial herbs with alternate, simple, petiolate leaves and large axillary, solitary, white or violet-tinged flowers with a plaited limb; calyx large, tubular; capsule large, prickly.

- Annual.
  - Calyx prismatic; teeth of the corolla acute.
    - Capsule erect; prickles stout.
      - Flowers white; lower prickles of capsule shorter than the upper........................ 1. *D. stramonium.*
      - Flowers violet; stems reddish purple; capsular prickles nearly equal.................. 2. *D. tatula.*

Capsule nodding; prickles stout, pubescent.
  Corolla white tinged with purple, 5-7 cm. long. 3. *D. discolor.*
Perennial.
  Calyx tubular; corolla violet-tinged, the teeth long subulate .... 4. *D. meteloides.*

1. **D. stramonium** L. Discovered near Ballona in 1893 and 1896, not since collected.

2. **D. Tatula** L. A garden escape near San Bernardino. 1870.

3. **D. discolor** Bernh. Long established in the Colorado River bottoms and possibly indigenous acc. to *Parish.*

4. **D. meteloides** DC. A frequent wayside weed in the valleys. July-Sept.

2. NICOTIANA. Tobacco.

Herbs or shrubs with mostly viscid-pubescent, alternate, entire leaves and terminal panicles of white or yellow flowers; corolla 5-lobed or toothed, funnelform or salverform; calyx persistent, fruit a capsule.

Herbs.
  Cauline leaves clasping; corolla less than 25 mm. long; perennial .... 1. *N. trigonophylla.*
  Cauline leaves petioled; corolla white, more than 25 mm. long........................ 2. *N. attenuata.*
  Cauline leaves subsessile; corolla greenish-white, nearly twice as long as the calyx....... 3. *N. Clevelandi.*
  Cauline leaves sessile; corolla white, about 4 cm. long .... 4. *N. Bigelovii.*
Shrub, arborescent, glaucous throughout; flowers greenish-yellow .... 5. *N. glauca.*

1. **N. trigonophylla** Dunal. Colorado Desert. April.

2. **N. attenuata** Torr. Throughout the higher mountains, more frequent on the desert slope. June-July.

3. **N. Clevelandi** Gray. In dry beds of streams Chollas Valley, San Diego, type locality; Santa Barbara; sand dunes Ballona, *Abrams.* April-May.

4. **N. Bigelovii** Wats. Occasional in sandy ground on the plains. April-July. The var. *Wallacei* Gray, a form with smaller flowers and roundish somewhat clasping leaves is credited to Los Angeles and San Diego in *Synopt. Flora.*

5. **N. glauca** Graham. A well established shrub in the vicinity of cities, flowering nearly all season.

3. PETUNIA.

Prostrate trailing annuals with sessile narrow spatulate leaves and small purplish-red flowers solitary in the axils; calyx of 5 foliaceous sepals united only at the base; capsule ovoid.

1. **P. parviflora** Juss. In low moist lands. June-August.

4. LYCIUM. Box-thorn.

Divaricately branched mostly spiny shrubs with alternate small linear leaves commonly fascicled in the axils, flowers solitary or few axillary; corolla funnel- or salverform, white or purplish, 5-lobed; berries small, red, somewhat dry.

Herbage not glandular-pubescent.
  Corolla tube equalling the calyx.
    Leaves glabrous, thick; filaments hairy.......... 1. *L. californicum.*
  Corolla twice the length of the calyx; sepals exceeding the tube...................... 2. *L. Richii.*
  Corolla tube 3 times as long as the calyx.
    Calyx lobes oblong nearly equalling the tube..... 3. *L. Parishii.*
    Calyx lobes triangular, much shorter than the tube.
      Corolla lobes tomentose on margins; filaments hairy .... 4. *L. Torreyi.*
      Corolla lobes glabrous on the margins; filaments sparsely hairy .... 5. *L. Andersonii.*
Herbage glandular-puberulent.
  Corolla tube twice the length of the calyx; flowers white; leaves broadly spatulate......... 6. *L. Cooperi.*
  Corolla tube equalling the calyx; flowers lavender; leaves linear .... 7. *L. verrucosum.*

1. **L. californicum** Nutt. On bluffs near the sea from Santa Monica to San Diego, the type locality. March-April.

2. **L. Richii** Gray. San Diego, *Stokes;* the solitary large specimen that for many years was a feature of Avalon has been destroyed. June.

3. **L. Parishii** Gray. One solitary bush of this was found on a mesa near San Bernardino, now extinct.

4. **L. Torreyi** Gray. On the Mexican border.

5. **L. Andersonii** Gray. Not infrequent at Palm Springs and on the Colorado Desert; San Diego. April-May.

6. **L. Cooperi** Gray. Fairly common on the Mohave Desert; Colorado Desert. May.

7. **L. verrucosum** Eastw. San Nicolas Island, type locality. April.

5. PHYSALIS. Ground Cherry.

Annual or perennial herbs with simple leaves and axillary flowers; calyx enlarging after flowering and forming a membranous envelope for the 2-celled berry; corolla rotate, yellow or cream colored.

Annual.
Flowers light or greenish-yellow with a dark center.
Leaves glabrous at maturity; pedicels 2 mm. long 1. *P. ixocarpa.*
Leaves villous on veins and midribs; pedicels 8 mm. long, shorter than the pubescent, viscid calyx .... 2. *P. pubescens.*
Leaves viscid pubescent; pedicels longer than the calyx .... 3. *P. Greenei.*
Flowers white, without a dark center............ 4. *P. Wrightii.*
Perennial; corolla yellow, without a dark center; fruiting calyx 5-angled................ 5. *P. crassifolia.*

1. **P. ixocarpa** Brot. (P. aequata Jaxq.) Frequent in cultivated fields. May-September. A native of Mexico.

2. **P. pubescens** L. Southern borders of San Diego Co.

3. **P. Greenei** Rose. San Joaquin Hills; Santa Margarita Ranch, San Diego Co., *Abrams.*

4. **P. Wrightii** Gray. A native of the Colorado delta and spreading by irrigation, acc. to *Parish.*

5. **P. crassifolia** Benth. Frequent on the Colorado Desert. May.

6. SOLANUM. Nightshade.

Annual or perennial herbs, sometimes prickly, ours with simple leaves and mostly rotate, 5-cleft or lobed flowers; stamens adnate near the throat, anthers opening by terminal pores; stigma entire; fruit a berry containing many flattened seeds.

Plants not prickly.
Corolla white, deeply 5-parted; peduncles longer than the pedicels.
Annual.
Berries black; leaves repand or entire......... 1. *S. nigrum.*
Berries green and half invested by the calyx; corolla minute; leaves rhombic-ovate, villous-hirsute .... 2. *S. villosum.*
Perennial; petals sometimes bluish; stems rough angled .... 3. *S. Douglasii.*
Corolla blue, moderately 5-lobed; peduncles shorter than the pedicels; perennial.
Leaves entire; stems glabrate or viscid-pubescent.
Herbage viscid-pubescent .... 4. *S. Xanti.*
Herbage glabrate or hispidulose............... 5. *S. Xanti glabrescens.*
Leaves subcrenate, large; stems long-hirsute..... 6. *S. Wallacei.*

Plants prickly.
  Calyx prickly, enclosing the berry; corolla yellow... 7. *S. rostratum.*
  Calyx not prickly, not enclosing the berry; flowers bluish .... 8. *S. elaeagnifolium.*

1. **S. nigrum** L. Rare and local, near Upland, *Johnston;* Riverside 1906.

2. **S. villosum** Lam. Occasional along borders of cultivated fields; Los Angeles 1892.

3. **S. Douglasii** Dunal. Plentiful in half shaded places along streams and waysides.

4. **S. Xanti** Gray. Common in the foothills in all our mountains. April-June.

5. **S. Xanti glabrescens** Parish. Occasional in the interior mountains from San Bernardino to San Diego. May-June.

6. **S. Wallacei** Gray. Near Santa Barbara, *Abrams;* Catalina Island, type locality. April-May.

7. **S. rostratum** Dunal. Local at Upland; Mentone; Santa Monica; Redondo 1884.

8. **S. elaeaginifolium** Cav. Occasional along railroads, San Diego; Oceanside; San Pedro; Corona 1895.

11. SCROPHULARIACEAE. FIGWORT FAMILY.

Herbs or shrubs with opposite or alternate exstipulate leaves and perfect irregular flowers; calyx persistent with 4-5 teeth or divisions; corolla 2-lipped or nearly regular; stamens 4 or 5, usually of 2 kinds; ovary 2-celled, superior, the styles united or nearly distinct; fruit a 2-celled 2-valved capsule, or rarely baccate; seeds usually numerous.

Leaves alternate.
  Anther-bearing stamens 5...................... 1. VERBASCUM.
  Anther-bearing stamens 4.
    Calyx tubular, 2-cleft, the segments entire or toothed ....13. CASTILLEIA.
    Calyx tubular or campanulate, 4-cleft...........14. ORTHOCARPUS.
    Calyx spathe-like, of 2 distinct leaf-like divisions or the anterior division wanting........15. CORDYLANTHUS.
    Calyx narrowly campanulate, 2-5-toothed; leaves pinnately divided.....................16. PEDICULARIS.
Leaves opposite or the upper sometimes alternate.
  Corolla-tube with a sac at the base............... 3. ANTIRRHINUM.
  Corolla-tube with a spur at the base.............. 2. LINARIA.
  Corolla-tube without a sac or spur at the base.
    Stamens with anthers 4, the fifth represented by a scale on the upper lip............... 6. SCROPHULARIA.
    Stamens with anthers 4, the fifth represented by a sterile filament...................... 7. PENTSTEMON.

Stamens with anthers 4, the fifth represented by a gland at the base of the corolla....... 5. COLLINSIA.
Stamens with anthers 4, the fifth wholly wanting.
Corolla tubular or funnelform often elongated.
Shrubs, calyx prismatic.................... 8. DIPLACUS.
Herbs, calyx prismatic.
Calyx 5-toothed .... 9. MIMULUS.
Calyx 5-cleft ....11. STEMODIA.
Corolla nearly regular; leaves in a basal rosette. 12. LIMOSELLA.
Stamens 4, 2 sterile.
Corolla small, 6-8 mm. long, little exceeding the calyx ....10. MIMETANTHE.
Corolla large, 4 cm. long..................... 4. MOHAVEA.
Stamens 2; corolla nearly regular...............17. VERONICA.

2. LINARIA. TOAD-FLAX.

Glabrous annuals or perennials with linear or oblong entire leaves alternate or verticillate and flowers in racemes; calyx 5-parted; corolla spurred at base, 2-lipped; stamens 4, included; capsule subglobose.

Flowers blue to white............................ 1. *L. canadensis.*
Flowers yellow.
Leaves linear .... 2. *L. vulgaris.*
Leaves broadly lanceolate....................... 3. *L. dalmatica.*

1. **L. canadensis** Dum. Occasional in cultivated fields throughout our region.

2. **L. vulgaris** Mill. A few plants at Upland, *Johnston.* 1916.

3. **L. dalmatica** Mill. Established a few miles from Sturtevant Camp, Los Angeles Co., *Kesseler,* 1919.

1. VERBASCUM. MULLEIN.

Tall coarse biennial or perennial herbs with thick, oblong leaves and a rosette of similar basal ones; flowers yellow, rotate, crowded in a thick terminal spike; calyx 5-parted; stamens 5, exserted; capsule 2-valved.

Leaves crenate, densely woolly, strongly decurrent... 1. *V. Thapsus.*
Leaves doubly-serrate, glandular hairy, not or very slightly decurrent .... 2. *V. virgatum.*

1. **V. Thapsus** L. Local near Riverside and Colton, 1906.

2. **V. virgatum** With. Roadsides and wastes, Pomona; El Monte; Sierra Madre. A native of Europe.

3. ANTIRRHINUM. SNAPDRAGON.

Annual or perennial herbs with the upper leaves alternate and the lower opposite; flowers axillary or terminal; corolla saccate at base on the lower side; otherwise as in *Linaria.*

Perennial.
Herbaceous, 6-9 dm. high.
Plant glandular pubescent and viscid; leaves lanceolate; corolla pinkish with yellow palate .... 1. *A. glandulosum.*
Shrubs; leaves opposite or in threes; flowers reddish-purple.
Leaves oblong, thickish, 2-3 cm. long; inflorescence soft-pubescent .... 2. *A. speciosum.*
Leaves linear, small; plant glabrous............ 3. *A. junceum.*
Annual.
Plants climbing by tortile branchlets.
Inflorescence viscid above, glabrous below; sepals nearly equal; plant erect.
Lower lip of the corolla greatly exceeding the upper; flowers yellowish white, palate dotted and lined...................... 4. *A. Coulterianum.*
Lower lip little exceeding the upper; seeds tuberculated .... 5. *A. Orcuttianum.*
Lower lip little exceeding the upper; seeds ribbed .... 6. *A. Nevinianum.*
Foliage viscid-pubescent throughout; posterior sepal much longer; plant prostrate, tortile branches few.
Leaves all sessile; flowers subsessile or short pedicelled .... 7. *A. subsessile.*
Leaves sessile above, short petioled below; flowers purplish, slender pedicelled...... 8. *A. Nuttallianum.*
Plants climbing by tortile petioles or peduncles.
Corolla violet purple; style persistent on capsule. 9. *A. strictum.*
Corolla yellow; style deciduous................10. *A. Cooperi.*
Plants without tortile parts; flowers small, about 5 mm. long ....11. *A. pusillum.*

1. **A. glandulosum** Lindl. Slopes of the foothills and lower mountains from Santa Barbara to San Bernardino and Los Angeles Co's., not common. June-July.

2. **A. speciosum** Gray. San Diego; Catalina Island.

3. **A. junceum** Gray. From San Diego, southwards.

4. **A. Coulterianum** Gray. Common on the foothills. April-June.

5. **A. Orcuttianum** Gray. Near San Diego.

6. **A. Nevinianum** Gray. San Juan Capistrano; San Diego.

7. **A. subsessile** Gray. Near the sea, Catalina; San Diego.

8. **A. Nuttallianum** Benth. Not common but generally distributed along the coast flats. May-June.

Var. *effusum* Gray. Stems lax and climbing; leaves larger and more cordate and all distinctly petioled. From Banning through the Colorado Desert. May.

9. **A. strictum** Gray. Common in the chaparral belt. May-June.

10. **A. Cooperi** Gray. Ravines near Fort Mohave; Palm Springs.

11. **A. pusillum** Brandeg. Point Loma.

4. MOHAVEA.

Erect viscid-pubescent annual about 2 or 3 dm. high with lanceolate, entire short petioled leaves and large, showy purple dotted, yellowish flowers; corolla tube short, the lips fan shaped, the upper 2-lobed the lower 3; fertile stamens 2.

1. **M. viscida** Gray. Common on the Colorado Desert, type locality.

5. COLLINSIA.

Annuals with opposite leaves, the lowest pair of which are often ternately divided, the others merely toothed or entire; flowers purple to white, axillary or in whorls forming a raceme; calyx campanulate deeply cleft; corolla with a short proper tube, gibbous or saccate throat and bilabiate limb, the middle lobe of the lower lip conduplicate, enclosing the stamens; stamens 4, a gland at the base of the corolla on the upper side answering to the fifth stamen; capsule ovate.

Flowers short pedicelled or sessile, in crowded whorls.	
Filaments bearded at base.	
Corolla lower lip rose-purple, the upper paler and little shorter; calyx lobes acute..........	1. *C. bicolor.*
Corolla pale purplish or white and streaked with purple, upper lip very short; calyx lobes obtuse	2. *C. tinctoria.*
Corolla whitish, lower lip tinged with purple; calyx usually white villous, its lobes obtuse	3. *C. bartsiaefolia.*
Filaments not bearded at base; calyx villous......	4. *C. concolor.*
Flowers with pedicels usually longer than the calyx; filaments glabrous.	
Flowers in pairs or threes.	
Stems tall, slender, simple; corolla deep blue; capsules longer than broad, long pedicelled; sepals lanceolate...............	5. *C. Parryi.*
Stems short, stout, much branched; corolla light blue; capsule broader than long, short pedicelled; sepals deltoid..............	6. *C. callosa.*
Flowers in umbel-like whorls.	
Herbage glabrous or pedicels puberulent.	
Pedicels longer than the calyx.	
Corolla violet-purple hardly exceeding the calyx	7. *C. parviflora.*

Corolla violet 8-10 mm. long; calyx lobes lanceolate, apex acute.................. 8. *C. pusilla.*

Pedicels shorter than the calyx.

Corolla upper lip white, lower with violet lobes .... 9. *C. Davidsonii.*

Herbage glandular-puberulent above, glabrate below.

Calyx lobes surpassing the capsule............10. *C. Childii.*

Calyx lobes equalling capsule; pedicels reflexed ....11. *C. monticola.*

1. **C. bicolor** Benth. Chinese Temples. Common in foothills and shady canyons. April.

2. **C. tinctoria** Hartw. Frequent in the upper chaparral belt in the San Gabriel Mts. May-June.

3. **C. bartsiaefolia** Benth. Canyons of the San Bernardino and San Diego Mts., in the upper chaparral belt. June.

4. **C. concolor** Greene. Abundant in Pacoima Canyon; southern San Diego Co., type locality.

5. **C. Parryi** Gray. Foothills of Los Angeles and San Bernardino Co's. May-June.

6. **C. callosa** Parish. Common along the foothills bordering the Mohave Desert, from Manzana to Swartout Canyon, the type locality. June-July.

7. **C. parviflora** Dougl. Strawberry Valley, San Jacinto, *Hall;* Tehachapi Mts. May-June.

8. **C. pusilla** Gray. Abundant in moist soil Bear Valley. June.

9. **C. Davidsonii** Parish. Lancaster, Mohave Desert. May.

10. **C. Childii** Parry. Shady places in the Transition Zone, San Bernardino and San Gabriel Mts. June.

11. **C. monticola** Davidson. San Gabriel mountains at about 1,800 meters. July-August.

6. SCROPHULARIA. Figwort.

Tall, nearly glabrous perennial with oblong-ovate coarsely toothed opposite leaves and loose cymes of small dull-reddish flowers in a narrow terminal panicle; calyx 5-cleft; corolla short, tube ventricose, limb of 5 unequal lobes, 4 erect, the fifth and lowest recurved; stamens 4, the fifth reduced to a scale; capsule ovate.

1. **S. californica** Cham. Frequent in shady canyons of the foothills. May-June.

7. PENTSTEMON. Beard-tongue.

Herbaceous or shrubby plants with opposite or verticillate leaves and showy flowers in terminal panicles; calyx 5-parted; corolla tubular or ventricose, the limb more or less bilabiate; anther-bearing stamens 4, the fifth filament sterile, more or less hairy or glabrous; capsules ovoid.

- Flowers scarlet, tubular.
  - Anthers opening for their whole length and spreading so as to become transverse.
    - Sterile filament bearded on one side.
      - Leaves ovate, cordate or truncate at base; plant puberulent, leafy to the top, scrambling over bushes .... 1. *P. cordifolius.*
      - Leaves linear-lanceolate, remotely denticulate, in whorls of 3; plant glabrous and glaucous .... 2. *P. ternatus.*
    - Sterile filament naked; leaves lanceolate, entire, upper pairs cordate, clasping; plant glabrous and glaucous................ 3. *P. centranthifolius.*
  - Anthers opening from base to near apex, not spreading after dehiscence; filaments naked.
    - Corolla obscurely bilabiate, lobes nearly alike... 4. *P. Eatoni.*
    - Corolla strongly bilabiate.
      - Lobes of corolla 12-16 mm. long; leaves narrow, lanceolate .... 5. *P. labrosus.*
      - Lobes of corolla 6-7 mm. long; leaves broader. 6. *P. Munzii.*
  - Anthers horseshoe-shaped, saccate at base; leaves spatulate-lanceolate; pedicels glandular pubescent; stamens exserted........... 7. *P. Bridgesii.*
- Flowers blue, bluish or violaceous.
  - Anther cells opening through their whole length.
    - Corolla tube widely dilated, the lobes spreading.
      - Leaves with rigid teeth.
        - Sterile filament glabrous; corolla rose-purple; leaves sessile below, connate-perfoliate above .... 8. *P. spectabilis.*
        - Sterile filament bearded; flowers white or cream-colored, tinged with blue.
          - Upper leaves connate-perfoliate; sterile filament densely yellow bearded......... 9. *P. Palmeri.*
          - Upper leaves usually not connate; corolla tube moderately dilated; sterile filament slightly bearded ....10. *P. Clevelandi.*
      - Leaves without teeth, linear, firm; sterile filament densely bearded at apex...........11. *P. fructiformis.*
  - Anthers horseshoe-shaped, opening from the apex to the middle.
    - Corolla tube widely dilated, rose-purple; leaves lanceolate or linear..................12. *P. heterophyllus.*
    - Corolla tubular, violet or purple, lobes short; leaves orbicular or sub-cordate.........13. *P. caesius.*

Flowers yellow or yellowish; anthers opening their whole length and spreading.
  Leaves oblong-lanceolate, denticulate; corolla 12 mm. long, pink striped, upper lip long haired; sterile filament naked..........14. *P. breviflorus.*
  Leaves small, oval, entire; corolla lemon-yellow 25 mm. long; sterile filament bearded......15. *P. antirrhinoides.*
  Leaves ovate, subsessile, undulate-dentate; corolla 8 mm. long, dull yellow veined with purple; filament pubescent at base.........16. *P. jacintensis.*

1. **P. cordifolius** Benth. Frequent in the foothills of all our mountains. April-July.

2. **P. ternatus** Torr. Occasional in the mountains at about 1,800 meters. June-August.

3. **P. centranthifolius** Benth. Common on the interior plains and in the foothills. April-June.

4. **P. Eatoni** Gray. Occasional in the San Bernardino Mts.

5. **P. labrosus** Hook. Abundant throughout the pine belt. June-August.

6. **P. Munzii** Johnston. Providence Mts.

7. **P. Bridgesii** Gray. Rare on the desert slopes of the San Gabriel Mts., but more frequent in the San Bernardino, San Jacinto and Palomar Mts. July-August.

P. Bridgesii x *heterophyllus* a hybrid has been recorded by *Hall* at Nellie, Palomar Mts.

8. **P. spectabilis** Thurber. Common in the foothills and lower mountain ranges. A hybrid between this and *P. centranthifolius* with the color of the flower and the shape of the leaf intermediate between the two, is *P. Parishii* Gray. Rare, San Jacinto Mt.; Cucamonga Canyon; San Gabriel Canyon near its mouth. May-June.

9. **P. Palmeri** Gray. Providence mountains and vicinity.

Var. *Grinnellii* M. & J. Closely resembles the type but is of lower and more slender habit with fewer flowers. Mt. Wilson, type locality. Frequent in the pine belt.

10. **P. Clevelandi** Gray. Borders of the Colorado Desert and San Diego Co. May-June.

Var. *Stephensi* M. & J. Differs from the type in having the sterile filament glabrous. Providence Mts.

11. **P. fructiformis** Cov. Mohave Desert near Willow Springs. May.

12. **P. heterophyllus** Lindl. On brushy foothill slopes. June-July.

13. **P. caesius** Gray. Frequent in Bear Valley, type locality; Cucamonga Peak; Mt. Islip. July.

14. **P. breviflorus** Lindl. Dry hills, Acton; frequent in the Tehachapi Mts. June-July.

15. **P. antirrhinoides** Benth. From Banning along the borders of the Colorado Desert; Santiago Canyon; San Diego Co. May-June.

16. **P. jacintensis** Abrams. Tahquitz Valley, San Jacinto, type locality. July-August.

8. DIPLACUS.

Evergreen glutinous low shrub with opposite, mostly serrate-toothed leaves revolute in the bud and showy flowers solitary in the axils; calyx 5-angled and 5-toothed, persistent; corolla with funnel-form tube and bilabiate limb; stamens 4; capsule opening by the upper suture.

- Flowers buff or salmon color.
  - Calyx viscid and villous; lobes of the upper corolla lip irregular .... 1. *D. longiflorus.*
  - Calyx strongly inflated above; lobes of the upper corolla lip shallowly toothed........... 2. *D. aridus.*
- Flowers scarlet; calyx viscid....................... 3. *D. puniceus.*

1. **D. longiflorus** Nutt. A generally distributed foothill shrub.

2. **D. aridus** Abrams. Desert slopes of the Cuyamaca Mts., *Abrams.*

3. **D. puniceus** Nutt. Islands and interior mountains from Santa Ana to Lower California.

9. MIMULUS. Monkey-flower.

Herbs with opposite leaves and mostly showy, red or yellow flowers solitary and axillary or in terminal racemes; calyx prismatic, 5-angled, 5-toothed; corolla with a pair of bearded ridges down the lower side of the throat; stamens 4; capsule dehiscent or indehiscent.

- Corolla white with crimson eye; calyx 12 mm. long, upper tooth larger; dwarf viscid-pubescent plant .... 1. *M. mohavensis.*
- Corolla crimson or crimson-purple.
  - Flowers on long pedicels.
    - Corolla 12 mm. long, twice the length of the calyx; leaves spatulate-oblong or linear, dentate or entire; calyx not oblique, teeth small .... 2. *M. rubellus.*
    - Corolla 20 mm. long, 3-times the length of the calyx, limb ample; leaves linear; calyx teeth small .... 3. *M. Palmeri.*

Flowers on very short pedicels, nearly sessile.

Cauline leaves ovate, tapering to the narrow base; calyx teeth large, one-half the length of the tube .... 4. *M. Bigelovii.*

Cauline leaves narrowly oblong and broadly attached; calyx teeth one-quarter the length of the tube.................... 5. *M. Fremonti.*

Cauline leaves broadly ovate, 3-5-nerved contracted to a short petiole; corolla tube long exserted, lower lip much shorter than the upper .... 6. *M. Douglasii.*

Corolla yellow, flowers axillary.

Flowers short pedicelled, 2.5-4 cm. long; plant viscid-pubescent .... 7. *M. brevipes.*

Flowers on slender pedicels.

Herbage viscid-pubescent.

Cauline leaves sessile, oblong-ovate, remotely dentate .... 8. *M. moschatus.*

Cauline leaves petioled, ovate cordate, sharply dentate .... 9. *M. floribundus.*

Herbage glabrous or minutely pubescent, not viscid.

Perennial; stems fistulous; corolla 2.5-5 cm. long, throat purple dotted............10. *M. Langsdorfii.*

Annual.

Lower leaves petioled; stems quadrangular and winged; corolla frequently purple blotched.

Corolla little surpassing the calyx; calyx teeth very unequal....................11. *M. nasutus.*

Corolla little surpassing calyx, calyx teeth nearly equal; leaves slightly toothed, petioles winged ....12. *M. clementinus.*

Corolla 15 mm. long; calyx oblique, upper tooth longer ....13. *M. microphyllus.*

Leaves usually all sessile; corolla little exserted, limb very small, white..........14. *M. latidens.*

Corolla golden yellow; flowers solitary and terminal..15. *M. primuloides.*

Corolla scarlet ....16. *M. cardinalis.*

Corolla pink ....17. *M. Parishii.*

1. **M. mohavensis** Lemmon. Sandy banks of the Mohave River.

2. **M. rubellus** Gray. Rare and local; Wilson's Peak; near Rock Creek; Bear Valley; Lake Surprise, San Jacinto Mt., *Hall.* June-July.

3. **M. Palmeri** Gray. Moist banks in the Transition Zone, San Bernardino and San Jacinto Mts. June-July.

4. **M. Bigelovii** Gray. Rare, on Wilson's Peak and the desert slope of the San Gabriel Mts.; Colorado and Mohave Deserts. July-August.

5. **M. Fremonti** Gray. Sand washes, San Fernando and other interior valleys and also in all the mountains in the Transition Zone. May-July.

6. **M. Douglasii** Gray. Catalina Island.

7. **M. brevipes** Benth. Common in the foothills and occasionally in the pine belt. April-June.

8. **M. moschatus** Dougl. Occasional along streams, Los Angeles; Forest Home, San Bernardino Mts., *Mohr.* April-June.

Var. *longiflorus* Gray. Less viscid and with more elongated corolla, growing on dry ground. Transition Zone, San Jacinto Mt., *Hall.*

Var. *sessilifolius* Gray. Common along streams in plains and mountains.

9. **M. floribundus** Dougl. Common along lowland streams and moist places up to 2,500 meters. June-October.

10. **M. Langsdorfii grandis** Greene. (M. luteus Gray.) Frequent along streams in plains and mountains.

Var. *Tilingii* Greene. A small form with entire leaves. Upper Transition Zones of the San Bernardino and San Jacinto Mts.

11. **M. nasutus** Greene. Shady canyons of the San Bernardino and San Jacinto Mts., Lower Transition Zone.

12. **M. clementinus** Greene. San Clemente, only locality.

13. **M. microphyllus** Benth. (M. luteus depauperatus Gray.) Occasional along streams in the pine belt in all our mountains.

14. **M. latidens** Greene. Southern border of San Diego Co.

15. **M. primuloides** Benth. Abundant in high wet meadows on San Bernardino and San Jacinto Mts. July-August.

16. **M. cardinalis** Dougl. Frequent along streams in the foothills and in the pine belt.

Var. *griseus* Greene. Leaves broadly oval, closely sessile, sparsely dentate. Catalina Island, only locality. May.

Var. *rigens* Greene. Leaves sharply dentate; peduncles twice the length of the leaves; calyx tube purple dotted. Neighborhood of San Bernardino. July.

17. **M. Parishii** Gray. Common on streams bordering the Mohave Desert and occasional in the chaparral belt from San Bernardino and Los Angeles to San Diego. June.

10. MIMETANTHE.

Villous annual with the general characters of the *Mimulus,* but the calyx not angled and the corolla obscurely bilabiate; stamens 4, 2 infertile.

1. **M. pilosa** Greene. Frequent along streams in the valleys and the mountains. May-August.

11. STEMODIA.

Viscid pubescent annuals with opposite linear-lanceolate, serrate leaves and purplish flowers; calyx 5-parted, somewhat bilabiate; corolla tube cylindrical, upper lip emarginate; stamens 4, anther cells separate and stipitate; capsule 2-valved.

1. **S. durantifolia** Swartz. San Diego Co. and Lower California.

12. LIMOSELLA. Mudwort.

Diminutive annuals with stoloniferous roots bearing a cluster of leaves at the nodes and small white or purplish flowers solitary on naked scapes; calyx 5-toothed; corolla nearly regular, 5-cleft; stamens 4, all fertile.

1. **L. aquatica** L. Muddy pools, San Bernardino Valley.

Var. *tenuifolia* Hoffm. Margins of Bear Valley Dam and Bluff Lake, rare. July.

13. CASTILLEIA. Indian Paintbrush.

Herbs or suffrutescent plants with alternate sessile leaves, the floral ones or their tips and the calyx-lobes colored like petals; flowers in terminal spikes; calyx tubular, cleft in front or behind or both, lobes 2-cleft; corolla tubular, laterally compressed, especially the long conduplicate upper lip, lower lip short and minute, 3-toothed; stamens 4, capsule 2-valved.

Annual.
  Calyx green; galea one-half longer than the tube. 1. *C. stenantha.*
Perennial; bracts colored, mostly red.
  Calyx red, deeper cleft before than behind; lower flowers pedicelled.
    Calyx 2-cleft at apex; plant villous-pubescent.... 2. *C. affinis.*
    Calyx upper lip 4-toothed; plant glabrous........ 3. *C. linaracfolia.*
  Calyx about equally cleft before and behind.
    Herbage viscid and villous or pubescent.
      Plant viscid-villous throughout; leaves broadly linear; galea exceeding tube........... 4. *C. Martini.*
      Plant viscid-puberulent above, glabrous below; leaves narrowly linear; galea shorter than the greenish yellow tube.......... 5. *C. californica.*
    Herbage white-woolly.
      Stems white-woolly, leaves tomentose........ 6. *C. foliolosa.*
      Stems and young herbage densely white-woolly. 7. *C. hololeuca.*
    Herbage cinereous with hirsute pubescence; bracts yellow tipped .... 8. *C. cinereal.*
  Calyx bilabiate, cleft deeper at the sides than before and behind; corolla yellow......... 9. *C. plagiotoma.*

1. **C. stenantha** Gray. Margins of streams in the valleys and high mountains in May-August.

2. **C. affinis** H. & A. Mohave Desert. May-June.

3. **C. linaraefolia** Benth. Stream banks, desert slope, San Gabriel Mts.; San Bernardino Mts. June-August.

4. **C. Martini** Abrams. Indian Paint-brush. Common on dry ridges Los Angeles; San Bernardino; Ventura and Orange Co's. April-August.

5. **C. californica** Abrams. Ranges with the last but much less common.

6. **C. foliolosa** H. & A. Snnny banks in all our mountains. May-August.

7. **C. hololeuca** Greene. Santa Cruz, only locality.

8 **C. cinerea** Gray. On stony hillsides in Bear Valley, the type locality. July.

9. **C. plagiotoma** Gray. Mohave Desert, type locality. June-July.

14. ORTHOCARPUS. Owl's Clover.

Annuals with cleft foliage and often the colored-bracted spikes of *Castilleia;* floral structure much the same; calyx 4-cleft or cleft before and behind and the divisions 2-cleft; corolla with upper lip not greatly exceeding the lower in length, but the lower inflated and 3-plaited or 3-saccate; stamens in some with but one anther cell.

Bracts with colored tips.
  Filaments glabrous .... 1. *O. densiflorus.*
  Filaments hairy .... 2. *O. purpurascens.*
Bracts herbaceous.
  Corolla yellow .... 3. *O. lasiorhynchus.*
  Corolla white, occasionally purplish.
    Calyx lobes much shorter than the tube......... 4. *O. hispidus.*
    Calyx lobes as long as the tube; galea curved... 5. *O. falcata.*

1. **O. densiflorus** Benth. San Diego Co.; occasional on Garvanza hills. May.

2. **O. purpurascens** Benth. Common in sandy soils in the valleys and hills up to 900 meters.

3. **O. lasiorhynchus** Gray. Moist ground in the Transition Zone, San Bernardino and San Jacinto Mts. June-July.

4. **O. hispidus** Benth. San Diego Co.

5. **O. falcata** Eastwd. Palomar Mt., *Eastwood.*

15. CORDYLANTHUS.

Branching annuals with alternate narrow leaves, either entire or 3-5-parted, and purplish flowers in terminal heads or scattered along the branches in small clusters; corolla tubular, the lips of nearly equal length; stamens 4 or 2; capsule flattened.

Calyx diphyllous (with upper and lower leaf-like divisions); leaves 3-5-parted.
  Anthers 1-celled.
    Flowers yellowish and purplish, 2 or 3 in axillary clusters; bracts one-half the length of the calyx........................ 1. *C. Nevinii.*
  Anthers 2-celled.
    Flowers purplish, 5-8 in terminal heads; bracts long-hirsute, 12-16 mm. long........... 2. *C. filifolius.*
Calyx monophyllous; corolla yellowish, upper lip purple-streaked, leaves entire.
  Herbage glaucous; bracts generally 3-toothed....... 3. *C. maritima.*
  Herbage canescent; bracts lanceolate.............. 4. *C. canescens.*

1. **C. Nevinii** Gray. Transition Zone, San Bernardino; San Jacinto and desert slope of the San Gabriel Mts. June-August.

2. **C. filifolius** Nutt. Dry ridges of the lower hills from Ventura to San Diego Co. June-July.

Var. *brevibracteatus* Gray. Pubescence hispid-ciliate. Santa Inez Mts. and near Santa Barbara.

3. **C. maritima** Nutt. Saline flats along the coast. May-July.

4. **C. canescens** Gray. Alkaline meadows, San Bernardino, *Ferris.*

16. PEDICULARIS. LOUSEWORT.

Perennial herbs with pinnate or pinnatifid leaves and crimson or yellowish flowers in dense bracteate spikes; calyx 2-5-cleft; corolla tubular, upper lip arched and compressed, the lower 3-toothed; stamens 4.

Flowers yellowish and purplish, pubescent outside, lower lip slightly shorter than the upper; filaments villous .... 1. *P. semibarbata.*
Flowers crimson; lower lip one-fourth the length of the upper; filaments glabrous.......... 2. *P. densiflora.*

1. **P. semibarbata** Gray. Not common but generally distributed in the pine belt. June-August.

2. **P. densiflora** Benth. Moist places, San Bernardino and San Diego Co's.; Laurel Canyon, Los Angeles. April-June.

17. VERONICA. SPEEDWELL.

Low annuals and perennials with leaves mostly opposite and small blue or white flowers, solitary in the axils or on terminal racemes; calyx 4-parted; corolla rotate, 4-parted; stamens 2; capsule compressed.

Perennial; leaves opposite; flowers blue or bluish with darker stripes.
  Flowers in axillary racemes; leaves ovate, serrate, short petioled; stems thick............ 1. *V. americana.*
  Flowers in terminal spike-like racemes.
    Leaves oval, toothed or entire, sessile............ 2. *V. alpina.*
    Leaves ovate or oblong, obscurely crenate, lowest short petioled, upper bractlike......... 3. *V. serpyllifolia.*
Annual; lower leaves opposite, upper alternate; flowers solitary in the axils.
  Peduncles short, 4 mm. long.
    Lower leaves denticulate, short petioled or sessile; flowers nearly white; capsule emarginate .... 4. *V. peregrina.*
    Lower leaves crenate, petioled; flowers small, light blue; capsule obcordate........... 5. *V. arvensis.*
  Peduncles longer than the crenate dentate leaves; flowers blue; capsule with divergent lobes 6. *V. byzantina.*

1. **V. americana** Schwein. Brooklime. Common along streams in Bear Valley. July.

2. **V. alpina** L. Mt. San Jacinto, *Parish.*

3. **V. serpyllifolia** L. San Bernardino and San Jacinto Mts. June-July.

4. **V. peregrina** L. Neckweed. Occasional in subalkaline soils in the valleys; Lancaster; Onstatt Valley, San Jacinto, *Hall;* June-July.

5. **V. arvensis** L. A casual in lawns Los Angeles and Santa Monica. 1900.

6. **V. byzantina** B.S.B. A garden escape along streets, San Bernardino and Los Angeles. 1896.

12. ACANTHACEAE. Acanthus Family.

Annual or perennial herbs or shrubs, with alternate or opposite leaves; flowers perfect, irregular, sometimes solitary, often subtended by large bracts; calyx of 5 variously united or distinct sepals; corolla of 5 partially united petals, 2-lipped; stamens 2 and equal, or 4 and didynamous; styles united; fruit a capsule, usually with 2 cavities opening longitudinally.

1. BELOPERONE.

Low shrub with irregular, often leafless, tomentose branches, with ovate, petioled leaves and terminal racemes of dull red flowers; calyx deeply 5-parted; corolla 25 mm. long with a stipe-like obcompressed base.

1. **B. californica** Benth. Palm Springs and through the Colorado Desert. May.

13. PINGUICULACEAE.

Aquatic or marsh herbs with bilabiate calyx and corolla, the latter personate and spurred or saccate on the lower side, only 2 stamens, their anthers confluently 1-celled and the free ovary 1-celled with a free central placenta; capsule many seeded.

1. UTRICULARIA. Bladderwort.

An aquatic plant with immersed stems and capillary dissected leaves, some of them with bladders; flowers in a raceme on a long emersed peduncled; corolla with a very short tube, bilabiate, the lower 3-lobed; stamens borne on the base of the corolla, connivent.

1. **U. vulgaris** L. Abundant in ponds in the San Bernardino Mts., *Parish.*

14. OROBANCHACEAE. Broomrape Family.

Plants without green herbage and parasitic on roots of herbs and shrubs; floral structure that of Scrophularineae, but capsules with parietal placentae; seeds very small and numerous.

Flowers bractless.
  Flowers regular or nearly so, solitary on long peduncles .... 1. Thalesia.
  Flowers bilabiate, concealed by the subtending scales .... 2. Boschnakia.
Flowers bracted, strongly bilabiate, crowded in dense spikes and panicles.................... 3. Myzorrhiza.

1. THALESIA.

Pale or yellowish plant with simple erect stems rising from a short caudex, stems with scale like leaves near the base and naked above; flowers yellowish, bractless; calyx nearly equally 5-cleft; corolla curved, slightly 2-lipped. *(Aphyllon.)*

1. **T. fasciculatum** Britt. Widely distributed mostly in the mountains, the most common species of the family, yet somewhat infrequent. May-July.

2. BOSCHNAKIA.

Thick stemmed, cone-like, reddish brown plants with flowers concealed by the imbricated bracts; calyx short, truncated behind, toothed in front; corolla ventricose, upper lip erect, entire or bifid, lower 3-parted.

1. **B. strobilacea** Gray. Plentiful on Mt. San Antonio, *Burlew;* Telegraph Peak and other peaks of the San Antonio Mts., *Johnston;* San Jacinto Mt., *Kessler.* Usually parasitic on *Arctostaphylos.* July.

3. MYZORRHIZA. Cancer Root.

Glandular pubescent herbs with densely flowered spikes; flowers bractate; calyx split above and below nearly to the base, the divisions 2-cleft or rarely entire; corolla 2-lipped. (Orobanche. Aphyllon.)

Herbage light colored; flowers pedicelled; calyx equally 5-cleft.
  Calyx-lobes nearly as long as the corolla-tube... 1. *M. comosa.*
  Calyx-lobes half as long as the corolla-tube.
    Flowers yellowish .... 2. *M. californica.*
    Flowers white; corolla tube contracted at mouth .... 3. *M. Hutchinsoniana.*
Herbage dark reddish-brown; flowers subsessile or short pedicelled; calyx unequally cleft.
  Flowers yellowish; stems with a tuber-like base. 4. *M. tuberosa.*
  Flowers purplish; calyx-lobes equalling the capsule .... 5. *M. Cooperi.*

1. **M. comosa** Hook. Acton; Little Rock. June.

2. **M. californica** Gray. Elysian Park, Los Angeles. Aug.

3. **M. Hutchinsoniana** Davidson. Palm Springs, type locality. May.

4. **M. tuberosa** Gray. Dry ridges from Monterey to San Diego, acc. to *Gray's Synopt. Flora;* occasional in the Santa Monica Mts.

5. **M. Cooperi** Gray. Not uncommon on the southern edge of the Mohave Desert and on the adjacent mountains. June-July.

15. BIGNONIACEAE. Bignonia Family.

Shrubs or low trees with simple or pinnate exstipulate leaves and large, perfect flowers in terminal racemes; calyx hypogonous, or 2 united sepals; corolla irregular, funnelform, 2-lipped; stamens 5, some of them reduced to sterile filaments; ovary 1-2-celled; style 1; stigmas 2; fruit a capsule, seeds winged.

1. CHILOPSIS. Desert Willow.

Arborescent shrub with lanceolate light green leaves and showy purplish flowers; calyx splitting into 2 concave lobes; corolla 25 mm. long, obscurely 2-lipped; capsule terete 10 cm. long or more.

1. **C. linearis** Sweet. Frequent on the borders of the Colorado Desert. May.

16. MARTYNIACEAE.

Coarse viscid-pubescent herbs with thick stems, long petioled, usually large, opposite or alternate leaves and axillary few flowered racemes of large yellowish-purple flowers; calyx-lobes 4-5, unequal; corolla funnel-form, obscurely 2-lipped; stamens 2-4; ovary 2-celled with 2 parietal placentae; style 1; stigmas 2; fruit a beaked, curved, woody capsule splitting at the tip to form 2 divergent hooks.

1. **M. altheaefolia** Benth. Devil's horns. Colorado Desert.

ORDER PLANTAGINALES.

PLANTAGINACEAE. PLANTAIN FAMILY.

Mostly acaulescent herbs with ribbed radical leaves, spicate inflorescence and regular 4-merous flowers; calyx persistent; corolla salverform, 4-parted; stamens 2-4, anthers versatile; ovary superior, 1-2-celled or falsely 3-4-celled with 1-several ovules in each cell; fruit a membranous capsule, circumscissile at or below the middle.

1. PLANTAGO. PLANTAIN

Characters of the family.

- Corolla closed over the mature capsule, forming a beak.
  - Leaves denticulate; spikes dense, except at base... 1. *P. hirtella.*
  - Leaves repand denticulate; spikes pale, dense throughout .... 2. *P. occidentalis.*
- Corolla remaining expanded, not closed over the mature capsule.
  - Perennial.
    - Leaves lanceolate; seeds 2..................... 3. *P. lanceolata.*
    - Leaves ovate; seeds 8-16.......... .... 4. *P. major.*
  - Annual.
    - Seeds 2.
      - Bracts linear to lanceolate.
        - Leaves entire.
          - Leaves short villous; bracts lanceolate, white villous, more than 3 mm. long... 5. *P. dura.*
          - Leaves glabrous, except the woolly base; bracts slightly pubescent at base........ 6. *P. oblonga.*
      - Leaves with slender, callous teeth, glabrate to woolly lanate.
        - Bracts triangular-lanceolate, silky-villous; spikes coarse and hoary..................... 7. *P. speciosa.*

Leaves entire or slender toothed.
Bracts linear-attenuate, pubescent to villous; spikes with internodes equaling or slightly surpassing the flowers.............. 8. *P. xerodea.*
Bracts oblong to ovate or orbicular.
Plant villous; bracts as long as the sepals or equaling the calyx.
Plant spreading, stout; leaves entire or toothed, lanate .... 9. *P. insularis.*
Plant erect, slender; leaves entire, villous......10. *P. brunnea.*
Plant short-stemmed; spikes villous; leaves densely white villous..................11. *P. fastigata.*
Plant pubescent or glabrate; bracts one-half as long as the sepals or shorter.
Leaves entire ....12. *P. erecta.*
Leaves with long subulate teeth..............13. *P. obversa.*
Seeds 4; leaves glabrous, linear-filiform, entire.......14. *P. Bigelovii.*

1. **P. hirtella** HBK. Occasional along moist roadsides.

2. **P. occidentalis** Dec. On the bluffs near Corona del Mar. May.

3. **P. lanceolata** L. Not uncommon in low grounds and along waysides. San Bernardino 1881.

4. **P. major** L. Frequent in low grounds. Native of Europe.

5. **P. dura** Morris. Catalina Island, type locality.

6. **P. oblonga** Morris. Colorado Desert, type locality.

7. **P. speciosa** Morris. Catalina Island; Avalon, type locality.

8. **P. xerodea** Morris. Southern California and Arizona; mouth of the Santa Ana Canyon, type locality.

9. **P. insularis** Eastw. Southern and Lower California.

10. **P. brunnea** Morris. Southern California, *Morris.*

11. **P. fastigata** Morris. Common on the Colorado Desert.

12. **P. erecta** Morris. On dry hillsides throughout the south; the common species.

13. **P. obversa** Morris. Catalina Island and the coast range; Del Mar, type locality.

14. **P. Bigelovii** Gray. Inglewood, *Abrams;* Corona del Mar. May.

ORDER RUBIALES.

Leaves with stipules, these often leaflike, adnate to the stems between the leaf bases........ 1. RUBIACEAE.
Leaves without stipules, or, if present, these adnate to the petioles....................... 2. CAPRIFOLIACEAE.

1. RUBIACEAE. Madder Family.

Low herbs or sometimes shrubs with opposite or verticillate mostly exstipulate entire leaves; flowers perfect or polygamous regular or nearly so; hypanthium adnate to the ovary; sepals deciduous or persistent; corolla of 3-6, rarely 10, more or less united petals; stamens as many as the lobes of the corolla and alternate with them, adnate to the tube; ovary 2-4-celled, with a solitary ovule in each cell; fruit indehiscent, dry or baccate.

Leaves in whorls without stipules.
Flowers white or greenish-white, in cymes......... 1. Galium.
Flowers blue with deeply divided involucre........ 3. Sherardia.
Leaves opposite, with stipules; flowers greenish-yellow 2. Kelloggia.

1. GALIUM. Bedstraw Cleavers.

Low annual or perennial herbs with slender angular stems, whorled leaves and cymose white or yellowish flowers; sepals often obsolete; corolla rotate, with 3 or usually 4 lobes; ovary 2-lobed, 2-celled, 2-ovuled; fruit of 2 nearly separate 1-seeded carpels, either glabrous or hispid, dry or fleshy.

Perennial.
Mature fruit berry-like, not hairy; leaves in 4's.
Plant erect.
Herbage hispid, leaves ovate................ 1. *G. californicum.*
Herbage glabrate, leaves narrow.............. 2. *G. Nuttallii.*
Plant low, matted; leaves rigid, crowded........ 3. *G. Andrewsii.*
Mature fruit hispid.
Leaves in 4's.
Fruit baccate; plant tall, suffrutescent, hispidulous .... 4. *G. grande.*
Fruit dry.
Bristles not hooked.
Herbage glabrous or minutely scabrous.
Leaves narrowly linear................ 5. *G. angustifolium.*
Leaves large, oblong.................. 6. *G. catalinense.*
Herbage cinerous-puberulent.
Leaves linear .... 7. *G. siccatum.*
Leaves broadly ovate.................. 8. *G. multiflorum.*
Leaves in 5's or 6's; bristles hooked........... 9. *G. triflorum.*
Mature fruit dry, smooth and glabrous.
Leaves in 4's, obovate; peduncles 1-flowered.....10. *G. Brandegei.*
Leaves in 5's or 6's, linear-lanceolate; peduncles usually 3-flowered ....11. *G. trifidum.*
Annual; fruit hispidulous, dry at maturity.
Leaves in 4's, alternate ones smaller; fruit on recurved pedicels ....12. *G. bifolium.*
Leaves in 8's................................13. *G. aparine.*

1. **G. californicum** H. & A. Frequent in all our mountains.

2. **G. Nuttallii** Gray. Common in the foothills.

3. **G. Andrewsii** Gray. Occasional on the desert slopes of the San Gabriel and San Antonio Mts., San Bernardino Mts.

4. **G. grande** McClatch. Frequent in the upper chaparral belt of the San Gabriel mountains.

5. **G. angustifolium** Nutt. Frequent in the foothills and lower ranges.

6. **G. catalinense** Gray. Catalina Island, not uncommon.

7. **G. siccatum** Wight. Wilson's Peak; Santa Monica mountains, *Abrams.*

8. **G. multiflorum** Kell. Frequent on the ranges bordering the desert; San Bernardino and San Jacinto Mts.

9. **G. triflorum** Michx. Not uncommon on shady banks in the San Bernardino Mts.

10. **G. Brandegei** Gray. Moist grounds, Bear Valley.

11. **G. trifidum subbiflorum** Wiegand. Occasional in moist places in the interior valleys; Bear Valley, type locality.

12. **G. bifolium** Wats. Near Knight's Camp, Bear Valley.

13. **G. aparine** L. Occasional in damp ground in the coast canyons and along mountain streams.

2. KELLOGGIA.

A slender herb with opposite lanceolate, sessile, entire leaves and small greenish yellow flowers in loose terminal cymes; corolla funnel-form, with 4 narrow lobes; stamens 4; ovary 2-celled; fruit small, hispid with hooked bristles.

1. **K. galioides** Torr. Very common in the San Bernardino and San Jacinto Mts.

3. SHERARDIA. Madder.

A slender, rough annual with exstipulate leaves in verticils of 6 and bluish flowers in subsessile umbels; corolla salverform with a slender tube and 4-cleft limb; stamens 4; fruit of 2 dry indehiscent carpels.

1. **S. arvensis** L. Gradually being established in lawns in Los Angeles, 1914.

2. CAPRIFOLIACEAE. Honeysuckle Family.

Small trees, erect or trailing shrubs or rarely herbs with opposite, simple or compound, often perfoliate leaves and perfect flowers in axillary pairs or terminal cymes; hypanthium adnate to the ovary; calyx of 4 or 5 sepals; corolla regular or irregular, lobes 4 or 5; stamens 4 or 5; ovary 2-5-celled, inferior; fruit a berry or drupe.

Leaves pinnate; corolla rotate...................... 1. Sambucus.
Leaves simple; corolla not rotate.
Corolla short, campanulate or tubular; berry white. 2. Symphoricarpos.
Corolla more or less bilabiate, broadly funnelform: berry red or black.
Flowers in terminal clusters.................. 3. Lonicera.
Flowers axillary in pairs, sessile on a common peduncle; bracts foliaceous............ 4. Distegia.

1. SAMBUCUS. Elderberry.

Shrubs or small trees with pithy branches, pinnate leaves and serrate leaflets; flowers small white or cream-color in terminal cymes; corolla rotate with 3-5 lobes; stamens 5; fruit of 3-5 nutlets forming the so-called berry.

Berry without bloom.............................. 1. *S. mexicana.*
Berry blue with a dense bloom.
Foliage glabrous .... 2. *S. coerulea.*
Foliage pubescent .... 3. *S. velutina.*

1. **S. mexicana** Presl. Southern California according to *Sargent.*

2. **S. coerulea** Raf. This is the common species of the foothills of the coast and interior ranges. May-June.

3. **S. velutina** Dur. & Hilg. Occasional in the Transition Zone on both sides of the San Gabriel Mts.; San Bernardino Mts. June.

2. SYMPHORICARPUS. Snowberry.

Low trailing or erect much branched shrubs with small mostly entire leaves and white or pinkish flowers, axillary or in spicate terminal clusters; hyanthium cup-shaped or subglobose; sepals 4 or 5, unequal; corolla campanulate or funnelform, 4- or 5-lobed; stamens 4 or 5; berry fleshy 2-seeded, white.

Corolla short, campanulate.
Pedicels very short; corolla lobes equaling the tube; leaves oval, soft pubescent....... 1. *S. mollis.*
Pedicels more than 12 mm. long; corolla lobes shorter than the tube; leaves ovate, mucronate, glabrous or slightly pubescent beneath .... 2. *S. racemosus.*
Corolla tubular.
Lobes shorter than the tube; leaves ovate, glabrate, paler beneath .... 3. *S. Parishii.*

1. **S. mollis** Nutt. Common among the shrubs in the chaparral belt; Santa Barbara, type locality.

3. **S. Parishii** Rydb. Somewhat rare in the San Gabriel and San Antonio mountains but fairly common in the San Bernardino Mts., the type locality. June.

2. **S. racemosus** Michx. Near Forest Home, San Bernardino Mts., *Miss Mohr.* June.

3. LONICERA. Honeysuckle.

Erect or climbing shrubs with subcoriaceous simple entire leaves, the upper pairs usually connate-perfoliate; flowers showy pink or yellow, in terminal spikes; calyx limb small and 5-toothed or obsolete; corolla bilabiate; stamens 5; fruit a red or yellow berry.

Uppermost leaves connate.
- Inflorescence glandular-hispidulous; stipules large; flowers pink .... 1. *L. californica.*
- Inflorescence glabrous; stipules none; flowers yellow 2. *L. interrupta.*

Leaves all distinct.
- Leaves tomentose beneath........................ 3. *L. subspicata.*
- Leaves glabrous or nearly so, green beneath...... 4. *L. denudata.*

1. **L. californica** T. & G. The common species on Catalina Island; not known on the southern mainland. May.

2. **L. interrupta** Benth. Not uncommon in the Transition Zones of the San Gabriel and San Bernardino Mts.; Topatopa Mts., *Abrams.* June.

3. **L. subspicata** H. & A. Common on bushy foothills from Santa Barbara to the San Bernardino mountains; Orange and Los Angeles Counties. May-June.

4. **L. denudata** Rehder. Foothills of San Diego County southward into Lower California, *Abrams.*

4. DISTEGIA.

Low shrub with erect stems, large ovate short-petioled leaves and scarlet flowers in pairs on axillary peduncles, subtended by 2 large foliaceous and accrescent purplish bracts; corolla funnelform, gibbous at the base; berries black.

1. **D. Ledebourii** Greene. Santa Barbara.

ORDER CAMPANULALES.

Vines with tendrils; flowers monoecious or dioecious. 1. Cucurbitaceae.

Plants not vines; flowers perfect.
- Corolla regular .... 2. Campanulaceae.
- Corolla split on one side, more or less irregular... 3. Lobeliaceae.

1. CUCURBITACEAE. Gourd Family.

Herbs tendril-bearing, trailing or climbing, commonly scabrous and succulent; flowers axillary to the alternate leaves, unisexual; calyx-tube coherent with the ovary, limb of 5 lobes or teeth; corolla with petals more or less united; anthers 2-celled, or 1 of them 1-celled; ovary 2-3-celled; stigma 3-5-lobed; fruit fleshy; seeds large, usually compressed, exalbuminous; cotyledons fleshy.

Fruit large, 5 cm. or more in diameter.
  Fruit smooth, orbicular; flowers large, yellow, solitary .... 1. Cucurbita.
  Fruit densely spiny, oblong; flowers small, white, racemose .... 2. Micrampelis.
Fruit minute; flowers small, white, the sterile racemose 3. Brandegea.

1. CUCURBITA. Cabazilla. Mock-orange.

Coarse trailing vines with solitary yellow flowers; flowers campanulate, 5-cleft to the middle, the lobes recurved; sterile flowers with filaments at the base of the corolla, the fertile with 3 rudimentary stamens; ovary with 3-5 placentae; fruit an indehiscent hard shelled globe.

Leaves triangular; fruit 3-celled, smooth............ 1. *C. foetidissima.*
Leaves palmately 5-cleft; fruit 5-celled, longitudinally ridged.
  Flowers 7.5 cm. long; calyx-tube 2.5 cm. long...... 2. *C. palmata.*
  Flowers 5 cm. long; calyx-tube 1.5 cm. long, fruit hispid .... 3. *C. californica.*

1. **C. foetidissima** HBK. Frequent on sandy plains.

2. **C. palmata** Wats. Palm Springs and the Colorado Desert.

3. **C. californica** Torr. Foothills near Redlands; San Diego Co., *Orcutt;* Cottonwood Springs, Colorado Desert, *Parish.*

2. MICRAMPELIS. Chilicothe. Big-root.

Membranous-leaved trailing or climbing herbs with simple tendrils and small white or greenish flowers, the fertile solitary, the sterile racemose or panicled from the same axil; fruit large, oblong or globose and densely covered with large, soft spines of varying length, 2-4-celled, seeds large; root very large, 3 dm. or more in diameter.

1. **M. macrocarpa** Greene. Common and widely distributed in the chaparral belt. Feb.-April.

3. BRANDEGEA.

Slender trailing herbs with 3-5-parted leaves, simple tendrils and small whitish flowers, the sterile flowers in small racemes, the pistillate on long slender pedicels with 3 abortive or fertile stamens; fruit minute.

1. **B. Bigelovii** Cogn. Colorado Desert foothills near Mecca, rarely collected.

2. CAMPANULACEAE. Bellflower Family.

Closely allied to *Lobeliaceae;* but corolla regular (in our genera); stamens quite distinct; style 1, with 2-5 introrse stigmas; flowers in all ours blue or bluish.

Capsule long and narrow.
  Capsule opening at the top; leaves small, linear.... 1. Githopsis.
  Capsule opening at the sides; leaves broadly ovate. 2. Specularia.
Capsule short and broad.
  Capsule opening at the sides; leaves orbiculate-cordate, clasping .... 3. Heterocodon.

1. GITHOPSIS.

Low, rigid branching annuals with lanceolate, sessile, toothed leaves and blue flowers; calyx tube 10-ribbed with 5 narrow rigid lobes; capsule opening by the narrow opening left by the falling style.

Plant erect with few branches; capsule pedicellate... 1. *G. specularioides.*
Plant diffusely branched; capsule sessile............. 2. *G. diffusa.*

1. **G. specularioides** Nutt. Soldiers' Home, Los Angeles; San Bernardino and San Diego Counties. May-June.

2. **G. diffusa** Gray. Not infrequent on dry, earthy slopes in the lower foothills throughout southern California. May-June.

2. SPECULARIA. Venus's Looking Glass.

Flaccid annuals with long slender stems and broad, ovate, sessile, crenate leaves; flowers of two kinds, the uppermost complete with a rotate 5-lobed blue corolla, the others apetalous, fertilized in the bud; capsule opening by 2-3 small lateral valves.

Leaves sessile, ovate or oblong..................... 1. *S. biflora.*
Leaves clasping, round-cordate...................... 2. *S. perfoliata.*

1. **S. biflora** Gray. Occasional on open grassy slopes throughout southern California. May-June.

2. **S. perfoliata** A. DC. San Diego County near the Arizona border.

3. HETERCODON.

Low, slender annuals with rounded, coarsely toothed, cordate and partly clasping leaves and dimorphous flowers as in the last genus; capsule opening on the sides irregularly.

1. **H. rariflorum** Nutt. Local in the mountains; Strawberry Creek, San Jacinto, *Hall;* Bear Valley, San Bernardino; Tehachapi. May-July.

3. LOBELIACEAE. Lobelia Family.

Herbs with milky juice, alternate simple leaves, and racemose or scattered flowers; calyx tube adnate to the ovary, the limb divided; corolla bilabiate lobed or cleft; stamens 5, alternate with the corolla-lobes; filaments and anthers united into a tube; ovary 1 or 2-celled, style entire; fruit a capsule.

Anthers and filaments united round the style.
  Corolla open down to the base on one side.
    Flowers large, scarlet........................ 1. Lobelia.
  Corolla with a closed tube.
    Calyx turbinate, lobes slender; flowers blue..... 2. Palmfrella.
    Calyx tube very long, stalk-like; corolla blue with yellow throat .... 3. Downingia.
Anthers entirely separate.
  Calyx wholly or partly free; flowers white or flesh colored, racemose on capillary stems; corolla irregularly bilabiate............ 4. Nemacladus.
  Calyx adnate to the ovary; flowers white, glomerate; corolla rotate, lobes nearly equal... 5. Parishella.

1. LOBELIA. Cardinal Flower.

Herbs with alternate lanceolate denticulate leaves and scarlet flowers in long terminal racemes, hypanthium adnate to the ovary; corolla conspicuously bilabiate; stamens 5, the filaments united above; fruit a capsule.

1. **L. splendens** Willd. Rare in marshes near Los Angeles, more common in wet places at middle altitudes in the mountains of Los Angeles, San Bernardino and San Diego Co's.

2. PALMERELLA.

Weak-stemmed nearly glabrous herbs with acute, lanceolate, serrate leaves and blue flowers in short terminal racemes; corolla tube elongated and straight, the limb bilabiate, the two upper lobes linear and recurved; filaments more or less adnate to the corolla up to near the throat, then monadelphous and free or farther adnate on one side only.

1. **P. serrata** Gray. Frequent on stream bottoms in the canyons of Los Angeles, Orange, Ventura and San Bernardino Co's. July-August.

3. DOWNINGIA.

Low herbs with entire, sessile, small ovate leaves and showy sessile flowers on a long calyx tube; flowers blue with the throat blotched with white and yellow, lower lip in ours trefoillike; capsule long and linear, crowned with the persistent calyx lobes, dehiscing below the apex by fissures.

1. **D. pulchella** Torr. In wet ground Menifee, Riverside Co. Occasional near San Bernardino and San Diego; Mohave Desert. May-June.

4. NEMACLADUS.

Low and diffusely branched annuals with wiry stems bearing racemes of many small flesh colored or white flowers; leaves ovate, denticulate, in a rosette at the base, cauline leaves minute; corolla bilabiate; filaments united at the base; capsule 2-celled, 2-valved from the top.

Basal leaves puberulent or hoary puberulent, denticulate; flowers white.
  Corolla little exceeding calyx; capsule not exserted. 1. *N. ramosissimus.*
  Corolla three times as long as calyx; capsule much exserted .... 2. *N. longiflorus.*
Basal leaves glabrous.
  Basal leaves entire; fruiting calyx broad as long... 3. *N. adenophora.*
  Basal leaves denticulate; fruiting calyx longer than broad .... 4. *N. montanus.*
  Basal leaves pinnatifid.......................... 5. *N. pinnatifidus.*

1. **N. ramosissimus** Nutt. On dry sandy plains from San Diego to San Bernardino County, May-June.

2. **N. longiflorus** Gray. Mt. Wilson; San Bernardino and San Jacinto Mts.; Colorado Desert. May-June.

3. **N. adenophora** Parish. Common in the northern part of the Mohave Desert and north through Kern and Inyo Counties; Rabbit Springs type locality. May-June.

4. **N. montanus** Greene. Frequent in the lower San Gabriel Mts.; San Bernardino and San Jacinto Mts. June.

5. **N. pinnatifidus** Greene. Sierra Madre Mountains; type locality; San Gabriel Mts. June.

5. PARISHELLA.

A small, glabrous winter annual with leaves and flowers in a radical tuft, the radial spreading branches bearing similar tufts; leaves spatulate, 4-10 mm. long; flowers short peduncled, corolla white.

1. **P. californica** Gray. Rabbit Springs, Mohave Desert, type locality. May.

ORDER VALERIANALES.

VALERIANACEAE. Valerian Family.

Herbs with opposite leaves and mostly perfect flowers in a cymose or thyrsoid inflorescence; calyx tube adherent to the ovary; limb either obsolete or composed of teeth which develop as a pappus or feathery crown upon the fruit; corolla more or less bilabiate, the lobes imbricate in the bud; stamens 1-3, epipetalous; filaments and style filiform; stigma undivided and truncate or minutely 3-cleft; fruit an achene; seed pendulous.

1. VALERIANELLA.

Weak-stemmed spring annuals with entire or sparingly toothed leaves and small pinkish flowers borne in glomerules at the end of the stem or branches; corolla spurred or gibbous at the base; fruit pubescent, variously winged.

1. **V. macrocera** Gray. Occasional on grassy slopes throughout our region. April-May.

ORDER CARDUALES.

Key to the Families.

Flowers all with tubular corollas or none, or only the imperfect ray flowers with ligulate corol-
  Stamens distinct; flowers unisexual...............Ambrosiaceae.
  Stamens united by their anthers or if distinct, the flowers perfect ....Asteraceae.
Corollas of all or only of the perfect flowers bilabiate or ligulate.
  Corollas all ligulate; herbage usually with milky juice; style branches filiform...........Cichoriaceae.
  Corollas of all or only the perfect flowers bilabiate; herbage without milky juice; style branches short, not filiform...........Mutisiaceae.

CICHORIACEAE. Chicory Family.

Herbs, mostly with a milky bitter juice; leaves mostly alternate, sometimes all basal; heads homogamous and ligulate, the flowers all perfect and with ligulate corollas; ligules 5-toothed at the apex; anthers auriculate at the base, not caudate; style branches filiform, minutely papillose, not appendaged.

Pappus paleaceous or none.
  Achenes without pappus........................ 2. Atrichoseris.
  Achenes with paleaceous pappus.
    Flowers blue; paleae truncate, without awns.... 1. Cichorium.

- Flowers yellow.
  - Bracts of the involucre plane; palea all awn-tipped.
    - Palea cleft at apex, the awn proceeding from the cleft .... 3. UROPAPPUS.
    - Palea not cleft at apex.
      - Annuals .... 4. MICROSERIS.
      - Perennial from a fusiform taproot........ 5. SCORZONELLA.
  - Bracts of the involucre concave, enfolding the marginal achenes; alternate paleae of central achenes awn-tipped............. 6. RHAGADIOLUS.
- Pappus of plumose bristles.
  - Receptacle chaffy, or with slender bristles among the flowers; leaves all radical.
    - Bracts with membranous margins, the outermost orbicular .... 7. ANISOCOMA.
    - Bracts all narrow, herbaceous.................. 8. HYPOCHAERIS.
  - Receptacle naked; leaves radical or cauline.
    - Achenes not beaked; flowers pink...............10. PTILORIA.
    - Achenes beaked.
      - Flowers yellow, the rays truncate and 5-toothed at apex; achenes 5- or 10-ribbed, transversely wrinkled .... 9. PICRIS.
      - Flowers white; leaves runcinate; involucres with a few calyculate outer bracts...........11. NEMOSERIS.
      - Flowers purple; leaves entire, narrow; involucres without calyculate outer bracts.12. TRAGOPOGON.
- Pappus of soft capillary bristles.
  - Achenes flattened.
    - Achenes beaked; pappus bristles falling separately; involucres cylindric ....18. LACTUCA.
    - Achenes beakless; bristles not falling separately; involucres campanulate ....17. SONCHUS.
  - Achenes not flattened.
    - Pappus deciduous, or 1-2 outer bristles persistent.
      - Achenes beakless, truncate; no tack-shaped glands ....13. MALACOTHRIX.
      - Achenes beaked.
        - Inflorescence with tack-shaped glands; achenes gradually narrowed above; receptacle with capillary bristles..................14. CALYCOSERIS.
        - Inflorescence not glandular, achenes truncate, short beaked ....15. GLYPTOPLEURA.
    - Pappus persistent or tardily deciduous.
      - Achenes beaked.
        - Plant scapose; pappus white or nearly so.
          - Achenes 10-nerved, not spinulose-muricate; involucres more or less imbricated......20. AGOSERIS.
          - Achenes 4-5-nerved, muricate-spinulose, at least near the apex; involucre of a single series of bracts with some calyculate outer ones ....16. LEONTODON.

Achenes beakless; truncate at the broad summit.

Flowers rose-colored; involucral bracts 4 or 5; heads 3-12-flowered; cauline leaves scale-like or none .... 19. Lygodesmia.

Flowers yellow or white.

Achenes tapering upward; pappus white; bracts in fruit somewhat thickened at base or on midrib.................... 21. Crepis.

Achenes not tapering upward; pappus sordid or reddish, rarely white; bracts not thickened .... 22. Hieracium.

1. CICHORIUM. Chicory.

Erect branching herbaceous perennial with basal and alternate cauline leaves and large heads of blue flowers in sessile clusters along the branches; involucre of 2 series of herbaceous bracts, the outer spreading, the inner erect; achenes 5-angled, truncate; pappus of 2 or 3 series of short, blunt scales.

1. **C. intybus** L. A native of Europe. Adventive in waste places.

2. ATRICHOSERIS.

Glabrous desert annual with broad basal leaves and a tall solitary scape, cymosely branched above; involucre of about 15 equal linear acute bracts and several small outer ones; receptacle scrobiculate; achenes oblong with corky-thickened pericarp; pappus none.

1. **A. platyphylla** Gray. Common on the Colorado Desert from Mecca east, and on the southern Mohave Desert, from the Ord Mts. east, acc. to *Hall.*

3. UROPAPPUS.

Nearly acaulescent annuals with pinnatifid or entire leaves and solitary heads on scape-like peduncles; involucre of a series of narrow inner bracts and a few calyculate outer ones; ligules short, yellow; achenes 10-12-ribbed; pappus-paleae 5, elongated, tipped with a very short awn or bristle which proceeds from the cleft summit. *(Microseris. Calais.)*

Achenes attenuate to a beak; pappus silvery white or brownish, the delicate awn about half as long as the deeply cleft palea........... 1. *U. linearifolius.*

Achenes truncate; pappus dull brown or sordid; awn arising from a shallow notch and but little shorter than the mature palea..... 2. *U. Lindleyi.*

1. **U. linearifolius** Nutt. Common on grassy banks in the foothills.

2. **U. Lindleyi** Nutt. About the same range as the other species, but less common.

Var. *Clevelandii* Hall. Has slender scapes and the achenes not narrowed toward the summit; awn less than half as long as the palea. San Diego, *Cleveland;* Colton, *Parish.*

4. MICROSERIS.

Acaulescent glabrous or somewhat puberulent annuals with basal leaves pinnatifid with mostly linear and often falcate lobes or entire; heads solitary in long, leafless scape-like peduncles, nodding in the bud, erect in fruit; involucre narrowly oblong to ovoid or subglobose; ligules short, yellow; achenes slender-fusiform or cylindric, ribbed, usually truncate; pappus paleae 5, short, abruptly or gradually passing into the scabrous awn.

Paleae reduced to a triangular base or obsolete...... 1. *M. elegans.*
Paleae conspicuous, 2 mm. or more long.
  Awns longer than the paleae..................... 2. *M. Douglasii.*
  Awns much shorter than the ovate paleae......... 3. *M. platycarpha.*

1. **M. elegans** Greene. San Diego to middle California. Santa Monica, *Hasse;* Santa Cruz Island and San Miguel Island; acc. to *Hall.*

2. **M. Douglasii** Gray. Upper Sonoran Zone. Elizabeth Lake; north slope of the Santa Monica Mts., *Abrams.*

3. **M. platycarpha** Gray. Common on the mesas of western San Diego Co. and northern Lower California in the Upper Sonoran Zone, *Hall.*

Var. *Parishii* Hall. Has slender achenes and the pappus paleae lanceolate, 6 mm. long, attenuate into an awn 2-4 mm. long. With the species.

5. SCORZONELLA.

Glabrous perennials with fusiform roots, stems mostly leafy at base with laciniate foliage, and long-peduncled heads which are nodding in the bud; involucre campanulate the bracts herbaceous, imbricated in several series, the inner long-acuminate, the outer successively shorter and acute; receptacle flat or convex, foveolate or alveolate; achenes linear or somewhat turbinate, 8-10-costate or -striate, truncate at summit; pappus-paleae 10, ovate or lanceolate, tipped with a generally much longer, straight, scabrous or barbellate awn.

1. **S. montana** Greene. Moist places in the Upper Sonoran Zone, not common. Crane Lake, Antelope Valley; Elizabeth Lake, *Parish.*

6. RHAGADIOLUS.

Herbaceous annuals branching from the base, with either glabrous or hispidulous herbage; basal leaves coarsely dentate or pinnatifid, the cauline often entire; involucre of 1 series of equal narrow bracts which in age become indurated and concave, enfolding the marginal achenes, and often an additional outer series of short linear bracts; ligules short, yellow; achenes narrow, terete or the outer subcompressed, 5- to 10-costate, the summit truncate to attenuate or beaked, the outer ones curved, the inner straight; pappus of marginal achenes a single series of short denticulate paleae; of central achenes a similar series of paleae alternating with stout bristles which are paleaceous-dilated at base.

1. **R. hedypnois** All. San Diego, *Mrs. Brandegee.* Introduced from Europe.

7. ANISOCOMA.

Scapes several from a strong taproot, each bearing a single rather large yellow-flowered head; leaves all in a basal tuft; involucre cylindric, the linear bracts linear and acute, the outer successively shorter and very obtuse, the outermost reduced to orbicular scales, all with green midrib and broad, scarious margins; receptacle flat, its scarious bracts linear; achenes oblong or somewhat turbinate, truncate, crowned with a narrow white border, 10-15 nerved, pubescent; pappus bright white, of 10-12 plumose bristles in 2 series (the outer sometimes naked).

1. **A. acaulis** Gray. In dry sandy soil of the desert area and the surrounding mountain ranges.

8. HYPOCHAERIS. Cat's ear.

Subscapose annuals or perennials with the leaves mostly in basal tufts; flowers yellow; involucres campanulate or cylindric, bracts rather few, lanceolate, imbricated, appressed, the outer successively shorter; receptacle flat, its chaffy paleae thin and narrow; achenes fusiform or oblong, 10-ribbed, tapering to a more or less distinct beak; pappus of plumose bristles, or some of the outer bristles shorter and not plumose.

Herbage pubescent; achenes all beaked..............1. *H. radicata.*
Herbage glabrous; outermost achenes truncate, inner
ones beaked .... 2. *H. glabra.*

1. **H. radicata** L. Gosmore. Pasadena, *McClatchie;* Redlands, *Greata.*

2. **H. glabra** L. A naturalized weed. Introduced from Europe.

Var. *erostris* Cos. & Germ. Plant more slender with few or no branches, entire or few toothed obovoid leaves, few-flowered heads and achenes all truncate. Dry clay soil at Upland, *Johnston,* acc. to *Parish.*

9. PICRIS. Bristly ox-tongue. Bugloss.

Erect hispid leafy herbs, with alternate leaves and rather large, corymbose or paniculate heads of yellow flowers; involucre campanulate; bracts in 1 series, nearly equal, with 2-3 series of small or large exterior spreading ones; receptacle flat, with short fimbriae; rays truncate, 5-toothed at the apex; achenes linear or oblong, terete or angled, 5-10 ribbed and transversely wrinkled, beaked in our species; pappus of 1-2 series of slender plumose bristles.

1. **P. echioides** L. Adventive from Europe. Colegrove, Dominguez Jct.; Huntington Park; widely distributed along roadsides throughout Los Angeles Co.

10. PTILORIA.

Nearly or quite glabrous annuals or perennials with branched stems, a tuft of usually pinnatifid basal and small, often scale-like cauline leaves; heads small, 3- to 20-flowered, paniculate or corymbose, with pink flowers; involucre cylindric, of several narrow appressed bracts and a few short calyculate outer ones; achenes, 5-angled, often with intermediate ribs; pappus a single series of soft plumose bristles. *(Stephanomeria.)*

- Receptacle deeply pitted, hirsute; involucre imbricated; root perennial; young herbage woolly .... 1. *P. cichoriacea.*
- Receptacle naked; involucre not imbricated but calyculate at base with minute bracts, rarely one or two intermediate bracts.
  - Involucre 10- to 14-flowered, 12 mm. or more high; perennial with sharply lobed upper leaves 2. *P. Parryi.*
  - Involucre 3 to 6 (or 9)-flowered, less than 12 mm. high.
    - Perennials.
      - Stems herbaceous, erect and very slender...... 3. *P. tenuifolia.*
      - Stems woody below, spreading and nearly leafless above.
        - Branches rigid, mostly divaricate........... 4. *P. runcinata.*
        - Branches very slender, flexuous, ascending.. 5. *P. myrioclada.*
    - Annuals and biennials.
      - Pappus plumose almost throughout, the base scarcely thickened.
        - Herbage glabrous .... 6. *P. virgata.*
        - Herbage white-tomentose when young....... 7. *P. tomentosa.*

Pappus plumose only above; the naked base thickened or paleaceous, often toothed or giving off short secondary bristles... 8. *P. exigua.*

1. **P. cichoriacea** Greene. Frequent in rocky canyons of the San Gabriel and San Bernardino Mts.; Tejon Pass; Santa Barbara Islands, *Hall.*

2. **P. Parryi** Coville. Mohave Desert eastward to Utah.

3. **P. tenuifolia** Raf. Mill Creek Canyon, San Bernardino Mts., *Parish.*

4. **P. runcinata** Greene. Lower Sonoran Zone of the Mohave and Colorado Deserts; nowhere abundant.

5. **P. myrioclada** Greene. Eastern San Bernardino Co., *Hall.*

6. **P. virgata** Greene. Common on the plains and foothills.

Var. *pleurocarpa* Hall. Achenes lighter colored, not grooved; pappus deciduous. With the species, especially toward the interior.

7. **P. tomentosa** Greene. Central part of Santa Cruz Island, *Greene.*

8. **P. exigua** Greene. A species chiefly of the desert area and eastward.

Var. *Deanei* Macbr. Intricately branched, the twigs very slender, more or less glandular. Southwestern San Diego Co., the type collected in Sweetwater Valley, by *Geo. C. Deane.*

Var. *pentachaeta* Hall. Less branched; herbage pale; pappus of 5-7 bristles, all distinct to the base which is slightly dilated and commonly with a few minute teeth, plumose only on the upper half. San Felipe, San Diego Co., *Parish;* Pacoima, San Fernando Valley, *Barber.*

11. NEMOSERIS.

Glabrous branching annuals with pinnatifid alternate leaves and large heads of white flowers more or less tinged with rose color; panicle somewhat cymosely branching; heads 15-30 flowered; involucre conical-cylindraceous, of 7-15 narrow equal bracts and numerous short calyculate outer ones; achenes terete, fusiform, few-ribbed, attenuate to a beak; pappus of 10-15 slender, long-plumose white bristles. *(Rafinesquia.)*

Pappus dull white; achenes with a very slender beak. 1. *N. californica.*
Pappus bright white; achenes stout-beaked.......... 2. *N. neo-mexicana.*

1. **N. californica** Greene. Under foothill shrubs, in the Upper Sonoran Zone; casual in the Lower Sonoran.

2. **N. neo-mexicana** Greene. Among shrubs of the Lower Sonoran of the Desert Area.

12. TRAGOPOGON. Salsify.

Tall glabrous biennial or perennial with fleshy tap-root, alternate entire linear-lanceolate long-acuminate leaves, and large long-pedunculate heads of purplish flowers; involucre narrowly campanulate, the few bracts in a single series; achenes terete, linear, slender-beaked; pappus a single series of plumose bristles connate at the base.

1. **P. porrifolius** L. Rather frequent as an escape from cultivation.

13. MALACOTHRIX.

Annual or perennial herbs, with a basal cluster of leaves and the stems either leafy or almost naked; involucre campanulate or turbinate, the bracts imbricated in 1 or 2 series with several series of shorter outer ones; receptacle naked or bristly; flowers yellow, white or pinkish; achenes short, truncate at the apex, with a denticulate border, 10-15 ribbed; pappus-bristles soft, scabrous, more or less united at base and falling together, or 1-8 outer ones more persistent.

Involucre imbricated in several series, its bracts silvery-scarious with green midribs, the outer short and orbicular.............. 1. *M. Coulteri.*
Involucre less imbricated; bracts lanceolate to linear, all acute.
  Annual, less than 6 dm. high.
    Scapose; leaves all basal; peduncles monocephalous .... 2. *M. californica.*
    Caulescent; stems branching and leafy, at least below.
      Leaves and their lobes filiform, elongated; persistent pappus-bristles 2 or more........ 3. *M. glabrata.*
      Leaves and their lobes shorter and broader; persistent bristles 1 or none.
        Ligules about 1 cm. long; desert species.... 4. *M. sonchoides.*
        Ligules 2 mm. long; stems leafy only below; montane species.
          Flowers yellow; 1 pappus bristle and a crown of setulose teeth persistent....... 5. *M. Clevelandi.*
          Flowers pale; pappus all deciduous...... 6. *M. obtusa.*
        Ligules short; stems very leafy throughout.
          Involucres 10-12 mm. high; leaves and their lobes acute...................... 7. *M. foliosa.*
          Involucres 6-7 mm. high; lower leaves with obtuse lobes .... 8. *M. indecora.*
  Perennial, mostly with woody base.
    Herbage white-tomentose when young; inner bracts of the involucre obtuse......... 9. *M. incana.*
    Herbage glabrous, bracts attenuate.
      Stems several, much branched from the base...10. *M. saxatilis.*
      Stem solitary, usually simple below...........11. *M. altissima.*

1. **M. Coulteri** Gray. San Diego Co. and Santa Cruz Island to the San Joaquin Valley, and to the border of the desert. Infrequent.

2. **M. californica** DC. Sandy soil throughout the coastal slope. In the mountains to about 1400 m. elevation.

3. **M. glabrata** Gray. Sandy places in the Lower Sonoran of the Mohave and Colorado Deserts. On the coastal slope in San Diego and Riverside counties.

4. **M. sonchoides** T. & G. Antelope Valley; Mohave Desert; Rabbit Springs, *Parish.*

5. **M. Clevelandi** Gray. Middle and lower altitudes in the mountains, from Santa Barbara Co. to Lower California.

6. **M. obtusa** Benth. Gravelly hillsides of the Upper Sonoran and Lower Transition Zones.

7. **M. foliosa** Gray. San Clemente Island, *Nevin & Lyon;* Santa Barbara Island, *Trask;* Santa Cruz Island, *Greene.*

8. **M. indecora** Greene. Santa Cruz, San Miguel, and San Nicholas Islands.

9. **M. incana** T. & G. San Diego to San Luis Obispo Co. and on the Channel Islands.

10. **M. saxatilis** T. & G. Santa Barbara, the type station, and Catalina Island.

Var. *tenuifolia* Gray. Stems several, almost wholly herbaceous; herbage glabrous; leaves acute, the lower sometimes 10 cm. long, the upper simple and linear, or pinnately parted into narrow lobes; ligules white with a pink median line. Hillsides and canyons from Santa Cruz Island and Santa Barbara to San Jacinto and San Diego.

Var. *implicata* Hall. Stems woody, densely leafy up to the inflorescence; leaves irregularly bipinnately parted into narrowly linear segments; flowers white, tinged with pink. Only reported from the channel Islands.

11. **M. altissima** Greene. Upper Sonoran Zone; mostly north of our region; reported from Newhall and near Redlands, acc. to *Parish.*

14. CALYCOSERIS.

Much branched desert annuals, glabrous below, the inflorescence with tack-shaped glands; heads rather large, long peduncled; involucral bracts many, scarious-margined, equal, with an outer series of shorter calyculate ones; receptacle with capillary bristles; achenes 5-ribbed, narrowed above to a short beak, terminating in a denticulate crown; pappus of numerous white bristles united at the base and deciduous in a ring.

Flowers yellow .... 1. *C. Parryi.*
Flowers white, turning purplish; var. californica of.. 2. *C. Wrightii.*

1. **C. Parryi** Gray. In the desert area from San Diego county to Utah.

2. **C. Wrightii californica** Brandegee. Colorado Desert.

15. GLYPTOPLEURA.

Tufted desert annuals with thick runcinate leaves and numerous short-peduncled heads; involucral bracts 7-12, linear-lanceolate, in 1 series and a few loose foliaceous ones at the base; flowers white, pink or yellow; achenes obtusely 5-angled, oblong, each of the intervals marked by 2 rows of large tubercles, abruptly contracted above to a stout beak, the base of which is surrounded by a narrow, cup-shaped border; pappus white, in several series, the outer falling separately.

Corollas white, turning pink; leaves with broad white scarious margins and short broad teeth.. 1. *G. marginata.*
Corollas yellow, turning pink; leaves with narrow white scarious margins and subulate, setiform teeth .... 2. *G. setulosa.*

1. **G. marginata** Eaton. Lower Sonoran Zone; Mohave Desert and north to Oregon.

2. **G. setulosa** Gray. Mohave Desert to southern Utah.

16. LEONTODON. Dandelion.

Perennial acaulescent herbs with pinnatifid, toothed, or rarely entire leaves and large heads of yellow flowers terminating the naked hollow scapes; bracts of the involucre mostly equal, with a number of shorter calyculate outer ones; receptacle flat, naked; achenes oblong to fusiform, 4-5 angled, 8-10 ribbed, spinulose above, tapering to a very slender beak; pappus of numerous persistent bristles spreading in fruit.

Outer bracts reflexed from the base; leaves deeply pinnatifid.
  Achenes greenish-brown .... 1. *L. taraxacum.*
  Achenes bright red.......................... 2. *L. erythrospermun.*
Outer bracts not reflexed from the base; leaves pinnatifid or denticulate, bright green .... 3. *L. lividum.*

1. **L. taraxacum** L. Frequent in lawns but apparently not becoming otherwise naturalized. Native of Europe.

2. **L. erythrospermum** Eichw. Frequent in the San Francisco Bay region and to be expected in southern California, acc. to *Abrams*.

3. **L. lividum** Waldst. & Kit. Wet meadows at 1,800 to 2,500 m. alt. in the San Bernardino Mts.; boreal and arctic regions generally.

17. SONCHUS. Sow Thistle.

Succulent herbs with alternate, auriculate-clasping, dentate or pinnatifid leaves, and corymbs of medium-sized heads of yellow flowers; involucre ovoid or campanulate, thickened at the base, the bracts in several series, the outer successively shorter; receptacle flat, naked; achenes oval, flattened, ribbed, truncate; pappus of soft smooth capillary bristles.

Leaves runcinately or lyrately pinnatifid into broad lobes, or sometimes only serrate.
  Leaf-auricles mostly acute; achenes longitudinally ribbed, the intervals transversely rugose. 1. *S. oleraceus.*
  Leaf-auricles mostly rounded; achenes longitudinally ribbed, the intervals smooth............ 2. *S. asper.*
Leaves pinnately parted into narrow lobes........... 3. *S. tenerrimus.*

1. **S. oleraceus** L. Common Sow Thistle. Naturalized European weed; waste places, flowering all the year.

2. **S. asper** All. Prickly Sow Thistle. Naturalized European weed, less common than the last.

3. **S. tenerrimus** L. Introduced at San Diego and on the Islands off the coast of Southern and Lower California.

18. LACTUCA. Lettuce.

Tall, leafy-stemmed herbs, with paniculate heads; involucre glabrous, cylindric, of few subequal bracts in a single series and numerous calyculate outer ones; achenes flattened, beaked; pappus of soft white or brownish bristles which fall separately.

Heads 6-15 flowered; achenes several-nerved, not rugose; leaves spinulose on the ribs.
  Leaves sinuate-dentate; achenes dark.............. 1. *L. virosa.*
  Leaves pinnatifid; achenes light colored........... 2. *L. scariola.*

1. **L. virosa** L. Common throughout the coastal slope; introduced from Europe.

2. **L. scariola** L. Less common than the last, but apparently becoming as widely distributed. Native of Europe.

L. sativa L., the common Lettuce, may sometimes be found as an escape from gardens.

19. LYGODESMIA.

Glabrous and often glaucous perennials with rigid stems, linear or scale-like leaves and rather large terminal heads of pink or rose-colored flowers; involucre cylindric, of few equal bracts and a few short calyculate outer ones; achenes slender, terete, obscurely striate or angled, truncate at each end; pappus of numerous whitish capillary bristles.

1. **L. exigua** Gray. Mohave and Colorado Deserts; Owens Valley to Lower California; extending to Utah and New Mexico, *Gray.*

20. AGOSERIS.

Acaulescent perennial herbs with mostly basal leaves and large scapose heads of (in our species) yellow flowers; involucre campanulate to oblong, of numerous narrow imbricated bracts, the outer successively shorter, herbaceous, not thickened; achenes terete, oblong or fusiform, 10-ribbed, beaked; pappus of numerous slender, simple white bristles inserted on the dilated apex of the beak. *(Troximon.)*

Perennial; involucres 2.5-5 cm. high.
  Achenes abruptly beaked from a broad truncate summit; ligules short.................. 1. *A. retrorsa.*
  Achenes tapering into the beak; ligules shorter than the involucre .... 2. *A. plebeia.*
Annual; involucre 1.2-1.8 cm. high; ligules inconspicuous .... 3. *A. heterophylla.*

1. **A. retrorsa** Greene. Occasional in loose, gravelly soil in the lower part of the pine belt.

2. **A. plebeia** Greene. Occasional in the San Gabriel, San Bernardino and Santa Ana mountains.

3. **A. heterophylla** Greene. A somewhat polymorphous species ranging from the San Jacinto and San Bernardino Mts. northward to British Columbia, and on the Islands from Guadalupe to Santa Cruz, *Hall.*

Var. *californica* Hall. Plant larger and coarser than the type; scapes 45 cm., or less, high; ligules conspicuous, much exceeding the involucre. In several forms the variety is found from Ventura county and the Tehachepi Mts. to El Dorado county.

21. CREPIS. HAWKSBEARD.

Herbaceous annuals, biennials and perennials with alternate or basal mostly toothed or pinnatifid leaves and small or middle sized heads, usually paniculate-corymbose, of yellow flowers; involucre cylindric or campanulate, swollen at the base, of few narrow bracts with several short basal ones; achenes narrowed toward the summit and sometimes also at the base, 10-30 ribbed; pappus copious, white and soft.

- Annual or biennial; introduced species.
  - Involucre 7-9 mm. high; achenes 10-striate......... 1. *C. virens.*
  - Involucre 9-12 mm. high; achenes 13-striate....... 2. *C. biennis.*
- Perennial; native species.
  - Plant low and tufted; achenes with dilated disk at summit; involucre 8-14 flowered, its principal bracts 8-10...................... 3. *C. nana.*
  - Plant more robust, more or less leafy-stemmed.
    - Achenes not discoid-dilated.
      - Involucres 5-10 flowered, its principal bracts 5-8 4. *C. acuminata.*
      - Involucre 10-30 flowered, its principal bracts 8-24 .... 5. *C. occidentalis.*

1. **C. virens** L. Big Rock Creek, on the desert slope of the San Gabriel Mts. Native of Europe.

2. **C. biennis** L. Occasional along streets of Los Angeles and Pasadena, and to be expected elsewhere. Introduced from Europe.

3. **C. nana** Richards. An arctic, alpine species. Summit of Mt. San Antonio, *Burlew.*

4. **C. acuminata** Nutt. On dry slopes in open forests of the Transition Zone.

5. **C. occidentalis** Nutt. On dry forested slopes of the Transition Zone; Bear Valley, San Bernardino Mts.; Pinos, Frazier and Alamo Mts., *Hall.*

Var. *subacaulis* Kell. Herbage usually hirsute with spreading glandless hairs; leaves deeply pinnatifid or bipinnatifid. Bear Valley to the northern Sierra Nevadas.

22. HIERACIUM. Hawk weed.

Perennial herbs (ours rough hirsute), with entire or dentate leaves and small or medium-sized paniculate heads; involucre of narrow, somewhat imbricated bracts with shorter ones at the base; achenes terete or angled, striate, beakless; pappus a single row of slender white or tawny bristles.

- Flowers white; stems tall......................... 1. *H. albiflorum.*
- Flowers yellow.
  - Stems leafy.
    - Pappus rufous or brown; herbage pubescent with long shaggy hairs; leaves entire........ 2. *H. horridum.*
    - Pappus nearly white; leaves mostly dentate.
      - Inflorescence leafy; peduncles and involucres with light-colored stipitate glands, or smooth .... 3. *H. Parishii.*

Inflorescence only bracteate; peduncles and involucres with black stipitate glands...... 4. *H. argutum.*
Stems nearly naked except at base; involucres and peduncles rough with stipitate glands... 5. *H. Grinnellii.*

1. **H. albiflorum** Hook. Open pine forests from San Jacinto Mts. north, throughout the state.

2. **H. horridum** Fries. Among rocks, or in decomposed granite in the Upper Transition and Canadian Zones.

3. **H. Parishii** Gray. Upper Sonoran Zone of the San Bernardino and San Gabriel foothills.

4. **H. argutum** Nutt. Santa Cruz Island, *Greene;* Santa Lucia Mts., *Plaskett;* Santa Rosa Island, *Brandegee.*

5. **H. Grinnellii** Eastwood. Frequent in the chaparral zone of the San Gabriel and San Bernardino Mts.

MUTISIACEAE.

Herbs or shrubs with alternate, simple, sessile or petiolate leaves and solitary, corymbose or paniculate heads of flowers surrounded by an involucre of more or less imbricated bracts; heads in our genera homogamous, the flowers all perfect and the corolla bilabiate; anthers long-caudate; style branches of the perfect flowers not appendaged, mostly very short.

Herbs; flowers white or pink; receptacle naked....... 1. PEREZIA.
Shrubs; flowers yellow; receptacle villous............ 2. TRIXIS.

1. PEREZIA.

Perennial herbs with thick reticulate-veined alternate sessile leaves and numerous heads in terminal cymose panicles; involucre imbricated; bracts dry, chartaceous or coriaceous; receptacle flat, naked; achenes puberulent, elongated, not rostrate; pappus of numerous capillary scabrous bristles.

1. **P. microcephala** Gray. Frequent on the dry interior plains and foothills.

2. TRIXIS.

Low, woody perennial with entire or denticulate alternate lanceolate leaves and corymbose medium-sized heads of yellow flowers, involucres many-flowered, the bracts 8-12, equal, in a single series, subtended by a few bract-like leaves; receptacle mostly pilose; style-branches flattened above, truncate; achenes slender tapering to the summit or beaked, 5-costate; pappus soft, copious.

1. **T. californica** Kell. In stony or gravelly soil of the Lower Sonoran Zone from the Colorado Desert to Arizona and New

Mexico. Canyons near Palm Springs; Whitewater; Chuckawalla Wash.

AMBROSIACEAE. Ragweed Family.

Annual or perennial herbs or shrubs with alternate leaves and small flowers, aggregated on a receptacle, surrounded by an involucre, the staminate and pistillate in the same or separate heads; involucral bracts few, distinct or united, those of the pistillate flowers often nut-like or bur-like at maturity, or winged; stamens usually 5, distinct; corollas all tubular; ovary 1-celled; stigmas 2, hairy or brush-like at the apex.

Staminate and pistillate flowers in the same head, the latter at the margin.
  Achenes wing-margined; involucre with 1-2 inner enlarged scarious bracts................ 1. Dicoria.
  Achenes not wing-margined; involucral bracts herbaceous.
    Leaves entire or nearly so; achenes glabrous.... 2. Iva.
    All but uppermost leaves pinnately parted; achenes villous .... 3. Oxytenia.
Staminate and pistillate flowers in separate heads on the same plant; involucre of pistillate flowers closed, only the style-branches exserted; staminate heads with open involucres.
  Shrubs; involucre of pistillate heads with broad scarious wings .... 4. Hymenoclea.
  Herbs; pistillate involucre bur-like.
    Staminate involucre with distinct bracts; pistillate involucre large, with hooked spines. 5. Xanthium.
    Staminate involucres with united bracts; pistillate involucres small, the spines not hooked.
      Pistillate involucre beaked at apex and armed with a single row of short spines....... 6. Ambrosia.
      Pistillate involucre with 1-4 beaks and armed with several rows of spines........... 7. Gaertneria.

1. DICORIA.

Low branched caulescent annuals with alternate petiolate leaves; heads heterogamous, of 1-2 fertile and several staminate flowers; pistillate flowers without corollas; involucre of 5 short, oval or oblong, herbaceous bracts and 1 or 2 inner enlarged scarious ones; achenes flat on the inner surface, convex on the outer, surpassing the outer involucre, conspicuously margined with a scarious pectinate border; pappus rudimentary, of several small scales.

1. **D. canescens** T. & G. Mohave and Colorado Deserts, east to Arizona and southern Utah.

2. IVA.

Coarse herbs and low shrubs with thickish alternate (or the lower opposite) leaves and numerous small axillary or loosely paniculate heads; involucre hemispheric of few rounded bracts; receptacle with linear or spatulate chaff; marginal flowers pistillate, 1 to 5, their corollas tubular or wanting; disk flowers perfect, with 5-lobed funnel-form corollas and undivided style; achenes flattened, glabrous; pappus none.

Involucral bracts united into a cup; stems herbaceous 1. *I. axillaris.*
Involucral bracts distinct; stems suffrutescent...... 2. *I. Hayesiana.*

1. **I. axillaris** Pursh. In saline or alkaline soil from southern California to British Columbia and Nebraska.

2. **I. Hayesiana** Gray. In brackish or alkaline soil of western San Diego Co. and southward.

3. OXYTENIA.

Shrubby perennial with erect branches and alternate leaves 3-5 parted into filiform divisions, or the upper often sparse and entire; involucral bracts about 5, somewhat coriaceous, their tips rigidly acuminate; bracts of the receptacle slender, chaffy, with cuneate-dilated tips; pistillate flowers about 5, destitute of corolla; staminate flowers 10 to 20; young achenes obovate, very villous with long soft hairs, terminated by a large areola; pappus none or a mere vestige.

1. **O. acerosa** Nutt. Alkaline plains from eastern California and Arizona to Utah.

4. HYMENOCLEA.

Diffusely branched zerophytic shrubs with glabrous or minutely canescent herbage; leaves alternate filiform, entire or the lower parted into filiform lobes; heads numerous, small, staminate and pistillate either intermixed in the panicles or the latter in the lower axils; involucre of staminate flowers saucer-shaped, 4-6 lobed; pistillate flowers solitary, the involucre ovoid or fusiform, beaked at the apex and winged with broad scarious scales.

Scales of the pistillate involucre spirally alternate, imbricated .... 1. *H. salsola.*
Pistillate involucre winged only from the middle with a single whorl of scales................ 2. *H. monogyra.*

1. **H. salsola** T. & G. Common in sandy washes and alkaline soil in the Lower Sonoran of the desert area.

2. **H. monogyra** T. & G. Mission Valley, near San Diego, and Lower California east to Arizona and Texas, in washes.

5. XANTHIUM.

Coarse annuals with branched stems and alternate toothed or lobed leaves; sterile and fertile flowers in different heads, the latter clustered below the short spikes or racemes of the staminate ones; fertile involucre coriaceous, ellipsoid or ovoid, covered with hooked spines so as to form a bur, 2-celled; achenes flat.

Leaves deltoid-ovate, their axils not spiny............ 1. *X. canadense.*
Leaves lanceolate, armed with triple spines in the axils .... 2. *X. spinosum.*

1. **X. canadense** Mill. A common weed along ditches and in waste places. Cocklebur.

2. **X. spinosum** L. An occasional weed in waste places.

6. AMBROSIA.

Coarse perennial herbs with mostly alternate lobed or dissected leaves and small inconspicuous flowers; staminate flowers nodding, in erect ament-like leafless racemes; involucral bracts united into a broadly turbinate cup; receptacle with bracts among the outer flowers; corollas funnelform, 5-lobed; pistillate heads in the axils of the upper leaves, at the base of the staminate racemes; involucre oblong or turbinate, closed, containing a single flower; corolla none; pappus none; fruit an achene-like bur, beaked and armed near the top with a single row of spines or tubercles.

Herbage rough pubescent; leaf lobes lanceolate, acute; fruit with blunt tubercles or unarmed... 1. *A. psilostachya.*
Herbage soft-pubescent; leaf-lobes crowded, short-oblong, obtuse; fruit obovoid, muticous, pubescent .... 2. *A. pumila.*

1. **A. psilostachya** DC. A common weed along roadsides and in waste places. Western Ragweed.

2. **A. pumila** Gray. Known only from the vicinity of San Diego.

7. GAERTNERIA.

Herbs or shrubs with mostly alternate leaves; habit, flowers and inflorescence as in *Ambrosia;* pistillate heads 1-4 flowered, the involucre closed, 1-4 celled and 1-4 beaked, armed with several rows of spines, in fruit becoming a bur.

Stems herbaceous; leaves pinnatifid or pinnately parted except in No. 4.
  Fruit 3 mm. or less long, the spines mostly uncinate 1. *G. tenuifolia.*
  Fruit larger, its spines straight.
    Staminate heads 2-4 mm. broad; spines thin; inland species .... 2. *G. acanthicarpa.*

Staminate heads 5-7 mm. broad; spines thick; seashore species.
Leaves 2- to 3-pinnatifid or pinnately parted... 3. *G. bipinnatifida.*
Leaves (at least the upper) merely serrate.... 4. *G. chamissonis.*
Stems woody.
Petioles present; leaves not spinose-dentate.
Leaves pinnately parted; bur with straight glabrous or minutely pubescent spines... 5. *G. dumosa.*
Leaves ovate, obtusely dentate or nearly entire; bur with uncinate spines woolly at base. 6. *G. chenopodiifolia.*
Leaves various; bur with straight spines villous to the tip .... 7. *G. eriocentra.*
Petioles none; leaves spinulose-dentate........... 8. *G. ilicifolia.*

1. **G. tenuifolia** Kuntze. Hollywood and Cahuenga Pass; dry plains near San Bernardino and San Jacinto, *Parish;* Colorado to Mexico.

2. **G. acanthicarpa** Britton. Common on sandy plains and in stubble from Southern California to Washington and Colorado.

3. **G. bipinnatifida** Kuntze. Common in sandy places along the beach from Lower California to British Columbia.

4. **G. chamissonis** Kuntze. San Miguel Island, *Greene;* along the coast from middle California to Washington.

5. **G. dumosa** Kuntze. Common on the Colorado and Mohave Deserts; east to Utah and south into Mexico.

6. **G. chenopodiifolia** Benth. San Diego and south into Lower California.

7. **G. eriocentra** Kuntze. Mohave Desert east to Arizona and Nevada.

8. **G. ilicifolia** Kuntze. Signal Mt., Colorado Desert, and south to Lower California, *Brandegee.*

ASTERACEAE.

Key to the Tribes.

Anthers not caudate at base.
Style-branches stigmatic only below the middle, more or less clavate, papillose-puberulent; heads always discoid, never yellow or brown .... I. EUPATORIEAE.
Style-branches stigmatic to the tip or to the appendage if present; heads commonly radiate and with yellow or brown disk-flowers.
Style-branches of the perfect flowers with more or less distinct appendages, these usually hairy outside, glabrous inside, but never with a ring of longer hairs....... II. ASTEREAE.

Style-branches of the perfect flowers without appendages, or if with appendages these hairy on both sides and with a ring of longer hairs.
Pappus never capillary; style branches rarely appendaged.
Bracts of the involucre herbaceous or foliaceous.
Receptacle with chaffy paleae subtending the flowers.
Involucral bracts in a single series, more or less enclosing the ray-achenes... IV. Madieae.
Involucral bracts in 2 or more series not enfolding the ray-achenes.......... V. Heliantheae.
Receptacle naked or with bristles, but not chaffy.
Plant tissues without oil-glands......... VI. Helenieae..
Plant tissues, especially the leaves and bracts, with oil-tubes; plants heavy-scented .... VII. Tageteae.
Bracts of the involucres dry and scarious...VIII. Anthemideae.
Pappus capillary; style-branches often appendaged .... IX. Senecioneae.
Anthers caudate at base: heads never radiate.
Anthers not appendaged at the top; heads heterogamous or dioecious; pistillate flowers with filiform corollas.................. III. Gnaphalieae.
Anthers with elongated cartilaginous, mostly caudate appendages at the top; flowers all perfect or the marginal neutral; corollas not [illegible]. .... X. Cynareae.

I. EUPATORIEAE.

Achenes 5-angled or -ribbed.
Involucral bracts 12-18, herbaceous, nerveless; pappus minute .... 1. Trichocoronis.
Involucre imbricated.
Pappus of 10-12 slender bristles................ 2. Hofmeisteria.
Pappus bristles only 3......................... 3. Malperia.
Pappus of numerous scabrous bristles........... 4. Eupatorium.
Achenes 10-nerved; involucral bracts not herbaceous, striate; pappus a single series of scabrous or plumose capillary bristles........... 5. Brickellia.

1. TRICHOCORONIS.

Herbs with creeping or spreading, branching, leafy stems, somewhat viscid pubescent; leaves opposite or the upper alternate, sessile and partly clasping; glabrate; heads slender-peduncled, terminating the branches; flowers flesh-color or rose-purple.

1. **T. wrightii** Gray. Cienega near Beaumont, Riverside Co., *Hasse,* acc. to Hall. Native of Mexico.

2. HOFMEISTERIA.

Low suffrutescent plants with medium-sized, long-pedunculate, many-flowered heads; involucre campanulate; bracts narrow, striate, the outer ones shorter; receptacle naked; achenes 5-angled, callous-thickened at the base; pappus of 10-12 scabrous bristles and an outer series of short, thin paleae.

1. **H. pluriseta** Gray. In canyons of the desert ranges, on rocky cliffs and in rock crevices.

3. MALPERIA.

Erect desert annual with narrow, alternate, sessile (except the lowermost) leaves and short-pedunculate, loosely cymose heads; involucre turbinate, the thin, narrow bracts very unequal, several-nerved; receptacle flat, naked; corolla narrowly cylindric with short, erect lobes; anther-tips ovate, obtuse; style-branches filiform, obtuse, thickened and exserted at maturity; achenes 5-angled, slender; pappus of 3 hispidulous setae alternating with minute truncate erose paleae.

1. **M. tenuis** Wats. San Diego Co., near the Lower California border and extending into Lower California.

4. EUPATORIUM.

Erect coarse perennial herbs with verticillate, opposite or alternate, entire or toothed leaves and corymbose heads of whitish or purplish flowers; heads discoid, 3-many-flowered; involucre cylindric to campanulate, of numerous imbricated bracts; receptacle flat, naked; achenes 5-angled; pappus a single row of scabrous capillary bristles.

1. **E. glandulosum** HBK. Collected on the bank of a pool near Pasadena by McClatchie in 1896. Probably a waif, as it has not since been collected.

5. BRICKELLIA.

Herbaceous or partly shrubby perennial plants with opposite or alternate leaves and discoid heads of whitish or pinkish flowers in panicles or cymes; involucral bracts chartaceous or membranous, striate, imbricated in several series; receptacle flat or convex, naked; achenes 10-striate or -ribbed; pappus a single series of scabrous or plumose capillary bristles.

Heads solitary, terminating corymbose branchlets, campanulate, 30- to 50-flowered.
  Leaves ovate, mostly with a broad base.
    Herbage green; leaves sharply pointed.......... 1. *B. arguta.*

Herbage white-tomentose; leaves not pointed..... 2. *B. incana.*

Leaves linear to oblong or obovate, with narrow base.

Inner involucral bracts with acuminate tips; leaves acute mostly 15-30 mm. long. Var. *linifolia* of .... 3. *B. oblongifolia.*

Inner involucral bracts acute; leaves spatulate-oblong, obtuse, mostly 5-15 mm. long.... 4. *B. frutescens.*

Heads loosely paniculate or glomerate, turbinate, mostly 5- to 25-flowered.

Involucral bracts 3-4-striate, subherbaceous at apex, more or less squarrose.

Bracts acute, entire; herbage white-lanate....... 5. *B. Nevinii.*

Bracts more or less 3-dentate-angulate; herbage pale green, tomentose or glandular-puberulent.

Stems and pedicels glandular-villous; heads about 13 mm. high, 20-24-flowered...... 6. *B. microphylla.*

Stems and pedicels lanulate; heads about 11 mm. high, about 18-flowered........... 7. *B. Watsoni.*

Involucral bracts erect; herbage little if at all tomentose.

Heads 8-18-flowered; involucral bracts 20-25; leaves ovate or sub-orbicular, crenate-serrate.

Heads small, 9 mm. high, 8-12-flowered; bracts acute; achenes 2.3 mm. long........... 8. *B. desertorum.*

Heads larger, about 14 mm. high, 8-18-flowered; bracts usually rounded, rarely acutish; achenes 3 mm. long.......... 9. *B. californica.*

Heads about 5-flowered; leaves lanceolate, glandular-punctate ....10. *B. Knappiana.*

1. **B. arguta** Robins. Among rocks in the Mohave and Colorado Desert Ranges.

Var. *odontolepis* Robins. Differs from the species in that the outer involucral bracts are conspicuously dentate. In the Colorado Desert, *Orcutt; Brandegee.*

2. **B. incana** Gray. Dry gravelly soil of the Mohave Desert, especially in sand-washes of the Lower Sonoran Zone.

3. **B. oblongifolia** Nutt., var. *linifolia* Robins. From the western border of the Colorado Desert east to Utah and Arizona.

4. **B. frutescens** Gray. Lower Sonoran of the Colorado Desert to Lower California.

5. **B. Nevinii** Gray. Frequent on dry sunny slopes of the Upper Sonoran Zone of the Coastal Slope.

6. **B. microphylla** Gray. Dry gravelly ground in San Antonio Canyon at 1,250 to 2,000 m., *Johnston;* Lytle Creek, *Johnston; Peirson.* In the Sierras north to Oregon and Idaho.

7. **B. Watsoni** Robins. Providence Mts., *Brandegee.*

8. **B. desertorum** Coville. Between Banning and Seven Palms, on the Colorado Desert, *Orcutt;* also in the southwestern part of the Colorado Desert, southern Nevada and northern Arizona.

9. **B. californica** Gray. Common in gravelly stream beds and on chaparral slopes of the Upper Sonoran from San Diego Co. and Lower California north to Mendocino Co.

10. **B. Knappiana** Drew. "In the neighborhood of the Mohave River," *Knapp;* Pleasant Canyon, Panamint Mts., *Hall & Chandler.*

II. ASTEREAE.

- Heads not unisexual, discoid or radiate; plants not dioecious.
  - Marginal pistillate flowers, if present, ligulate.
    - Ray-flowers yellow or none.
      - Pappus of awns or scales, never of capillary bristles.
        - Bracts not conspicuously scarious margined.
          - Heads large, usually viscid; pappus of few stout caducous awns.................. 8. GRINDELIA.
          - Heads small.
            - Only the ray-flowers fertile; pappus of the disk-flowers 5-20, bristles more or less flattened and united at base. 7. AMPHIPAPPUS.
            - Most of the disk-flowers as well as the rays fertile; pappus of several small scales .... 6. GUTIERREZIA.
        - Bracts with conspicuous scarious fimbriate margins ....10. ACAMPTOPAPPUS.
      - Pappus, at least in part, of capillary bristles.
        - Pappus of ray-flowers none...............11. HETEROTHECA.
        - Pappus of a few slender persistent bristles.. 9. PENTACHAETA.
        - Pappus in 2 series, the inner of capillary bristles, the other of scales or short bristles ....12. CHRYSOPSIS.
        - Pappus wholly of capillary bristles.
          - Rays none.
            - Outer flowers enlarged and more deeply cleft on the inner side............22. LESSINGIA.
            - Outer flowers not enlarged.
              - Involucres narrowly turbinate; bracts arranged in vertical ranks; usually shrubs ....19. CHRYSOTHAMNUS.
              - Involucres broadly turbinate or hemispheric; bracts not in vertical ranks.
                - Stigma tips obtuse; involucral bracts narrow, slightly imbricated. (Rayless species of)...........32. ERIGERON.

Stigma tips acute; bracts broad or well imbricated or both.

Flowers permanently yellow; inflorescence terminally cymose; corolla dilated above...........20. Isocoma.

Flowers yellow, changing to brown; inflorescence paniculate.21. Hazardia.

Rays present.

Shrubs; leaves resinous-punctate........18. Ericameria.

Herbs; leaves not resinous-punctate.

Leaves pinnately cleft, or the teeth spine-tipped or both...............17. Sideranthus.

Leaves entire or toothed, the teeth never spinose.

Plants low, cespitose, with short woody stems; leaves evergreen; heads solitary, long-pedunculate.15. Stenotus.

Stems wholly herbaceous; leaves not evergreen; inflorescence various.

Bracts, at least the outer, foliaceous or with prominent foliaceous tips; disk-flowers tubular; plants with tap-roots ....16. Pyrrocoma.

Bracts not foliaceous, or merely with green tips.

Rays more numerous than the disk-flowers; receptacle fimbriolate; heads corymbose..14. Euthamia.

Rays not more numerous than the disk-flowers; receptacle alveolate; inflorescence racemose or paniculate; bracts not in vertical rows........13. Solidago.

Ray-flowers never yellow; pappus of capillary bristles, at least in the disk-achenes.

Rays only slightly, if at all, exceeding the pappus; bracts in 1 or 2 series, narrow, not foliaceous; stigma-tips obtuse..........33. Leptilon.

Rays conspicuously exceeding the pappus, usually equalling or exceeding the width of the disk (rarely wanting); annuals or perennials.

Pappus of ray much reduced or wanting.

Perennial; herbage tomentose, at least when young ....23. Corethrogyne.

Annual; herbage not tomentose.

Leaves pinnatifid or incised; disk-pappus copious ....24. Psilactis.

Leaves entire; pappus-bristle solitary, plumose at tip....................25. Monoptilon.

Pappus of numerous capillary bristles
Stigma-tips triangular or ovate, obtuse or rarely acutish; bracts not foliaceous.
Involucres turbinate; bracts imbricated in several rows; ray white.........31. LEUCELENE.
Involucres hemispheric or broader; bracts in 1-3 rows; rays white to purple...32. ERIGERON.
Stigma-tips lanceolate to oblong or filiform; bracts often foliaceous.
Bracts in one series, with hyaline-scarious fimbriate margins; dwarf winter annual ....26. EREMIASTRUM.
Bracts in 2 or more series.
Annuals or biennials, without rootstocks; bracts in many series, with herbaceous-spreading or filiform tips 30. MACHAERANTHERA.
Perennials with rootstocks or caudices; bracts various.
Plants with axillary spines; leaves of stems scale-like or wanting..29. LEUCOSYRIS.
Plants without axillary spines.
Bracts narrow, acuminate; leaves and bracts spine-tipped; heads solitary at ends of stems or branches, distinctly peduncled..28. XYLORRHIZA.
Bracts in several series, not acuminate, or if attenuate soft-tipped; heads racemose or paniculate...27. ASTER.
Marginal pistillate flowers not ligulate, reduced to a filiform or short tube................34. ESCHENBACHIA.
Heads unisexual, discoid; plants dioecious...........35. BACCHARIS.

6. GUTIERREZIA.

Herbaceous or suffrutescent, much branched, more or less resinous plants with alternate, linear, entire leaves and numerous small heads of yellow flowers, cymose or paniculate at the ends of slender stems; involucre imbricated, the bracts coriaceous with green tips; ray-flowers few, pistillate, fertile; disk-flowers hermaphrodite, perfect or the central ones sometimes sterile; achenes short, obovate or oblong, terete or 5-angled; pappus of numerous oblong or narrower usually erose paleae.

Heads clavate-oblong.
Flowers of disk and ray 1 or 2 each............... 1. *G. lucida.*
Flowers of disk and ray 3 to 7 each............... 2. *G. Sarothrae.*
Heads obovate-turbinate; flowers of disk and ray 7 to 12 each .... 3. *G. californica.*

1. **G. lucida** Greene. Confined chiefly to dry hills of the Mohave Desert.

2. **G. Sarothrae** Britt. & Rusby. Dry plains and rocky hills of the Upper Sonoran Zone throughout our region.

3. **G. californica** T. & G. Dry hills from Arizona and the Colorado Desert north to San Francisco Bay.

Var. *bracteata* Hall. Has strongly divaricate branchlets and few large, solitary heads. Southwestern part of the Colorado Desert.

7. AMPHIPAPPUS.

Low, glabrous desert shrub with alternate, entire leaves; heads heterogamous, the ray-flowers yellow pistillate and fertile, the disk-flowers yellow, hermaphrodite-sterile; involucre imbricated; bracts thin, only the median portion being herbaceous; fertile achenes pubescent; pappus of ray-flowers of few short squamellae, coalescent at base; pappus of disk-flowers 5-20 weak bristles, somewhat dilated and united at base, nearly equalling the corolla.

1. **A. Fremontii** T. & G. Lower Sonoran Zone from near the northern border of our region into Inyo Co. and east to Nevada and Utah.

8. GRINDELIA.

Coarse perennial resinous herbs or suffrutescent plants with thick, rigid, mostly serrate leaves and rather large hemispheric heads terminating corymbose branches; involucre much imbricated of usually narrow herbaceous bracts with squarrose-recurved tips; flowers of both ray and disk yellow; achenes short, thick, compressed, glabrous; pappus of 2-8 caducous, stout awns. Involucral cups of the buds often completely filled with a white or creamy gum.

Leaves 2-8 cm. wide; insular species................ 1. *G. latifolia.*
Leaves narrower, rarely more than 2.3 cm. wide.
Stems woody below; leaves linear-oblanceolate or cuneate; salt-marsh species............. 2. *G. cuneifolia.*
Stems herbaceous.
Involucre 20-25 mm. wide; leaves 10-30 mm. wide. 3. *G. robusta.*
Involucre 10-15 mm. wide; leaves 5-15 mm. wide. 4. *G. camporum.*

1. **G. latifolia** Kell. Known only from the Channel Islands.

2. **G. cuneifolia** Nutt. Borders of salt marshes along the coast, *Abrams.*

3. **G. robusta** Nutt. Open ground about Los Angeles and along the coast to San Francisco. First collected at San Pedro by Nuttall.

4. **G. camporum** Greene. In heavy soil from San Diego Co. to middle California.

9. PENTACHAETA.

Small, slender, nearly glabrous annuals with alternate narrowly linear entire leaves and small heads, solitary or somewhat clustered at the ends of more or less naked branches; involucre turbinate-campanulate, its bracts in 2 series, narrowly oblong, scarious-margined, mucronulate, appressed; rays white, pink, yellow, or none; achenes oblong, flattened, pubescent; pappus of 5-12 slender bristles, often much reduced or wanting.

Involucre glabrous, its bracts very unequal.......... 1. *P. aurea.*
Involucre pubescent, its bracts nearly equal.......... 2. *P. Lyoni.*

1. **P. aurea** Nutt. Upper Sonoran and Lower Transition Zones from San Diego (the type locality) to the San Jacinto Mts. and San Luis Obispo Co.

2. **P. Lyoni** Gray. Coastal subarea of Los Angeles Co. San Pedro; Santa Catalina Island, *Lyon;* Point Firmin, *Peirson.*

10. ACAMPTOPAPPUS.

Low round-topped desert shrubs with slender rigid stems and alternate entire leaves; heads globose, terminal at the ends of the branches, 12-36 flowered, radiate or discoid; involucral bracts imbricated in 3 series, broad and obtuse, scarious-margined, erose-fimbriate; tube of disk-corollas funnel-form, the lobes lanceolate and acute; style-tips thick, subulate; achenes short-turbinate, densely long-villous; pappus equalling the corollas, of 15-18 flattened rigid awns, somewhat dilated at the end, and as many shorter setiform awns or bristles, all persistent.

1. **A. sphaerocephalus** Gray. Frequent in the Larrea and Yucca belts of the desert area, east to Arizona and Utah. Whitewater, Mint Canyon, *Peirson.*

11. HETEROTHECA.

Annual or biennial hirsute and glandular herbs with oblong or oblong-ovate, alternate, serrate leaves and a terminal corymbose panicle of middle-sized heads; involucre hemispheric or broadly campanulate, its narrow bracts imbricated in many series; both ray and disk flowers yellow, numerous and fertile; ray-achenes triangular-compressed with flat sides and narrow back, the pappus caducous or none; disk-achenes compressed, silky-hirsute, with double pappus, the inner of long capillary, scabrous bristles, the outer of short and stout bristles or scales.

Lower leaves petioled, the upper sessile; outer pappus of disk-flowers inconspicuous....... 1. *H. grandiflora.*
Leaves subcordate-clasping; outer pappus of disk conspicuous .... 2. *H. subaxilaris.*

1. **H. grandiflora** Nutt. A common weed in waste places throughout our region, except in the mountains.

2. **H. subaxilaris** Britt. & Rusby. May be expected along our eastern borders.

12. CHRYSOPSIS.

Perennial herbs, or somewhat suffrutescent, with alternate, sessile, entire leaves and radiate or discoid heads of yellow flowers terminating corymbose or fastigiate branches; involucre campanulate or hemispheric, of narrow, much imbricated bracts; achenes compressed, obovate to linear-fusiform; pappus brownish, of many capillary scabrous bristles with or without an outer series of short bristles or paleae.

Heads radiate.
  Outer pappus present.
    Herbage hispid-canescent; squamellae of outer pappus narrow, toothed at summit...... 1. *C. echioides.*
    Herbage hirsute or villous; squamellae of outer pappus often hidden by the dense villous tomentum of the achene............... 2. *C. sessiliflora.*
  Outer pappus wanting; herbage white with a soft appressed-silky tomentum............... 3. *C. fastigiata.*
Heads discoid; pubescence fine and soft; outer pappus obscure .... 4. *C. Wrightii.*

1. **C. echioides** Benth. Common in the Upper Sonoran Zone and occasional in the adjoining zones. Ramona, San Diego Co.; Antelope Valley; Mt. Pinos.

2. **C. sessiliflora** Nutt. Mendocino Co. to San Diego and Arizona.

3. **C. fastigiata** Greene. Upper Sonoran Zone, apparently rare. San Bernardino Valley, *Parish;* near Claremont, *Baker.*

4. **C. Wrightii** Gray. Mt. San Gorgonio, the type locality.

13. SOLIDAGO.

Perennial herbs with sessile or nearly sessile, alternate leaves and numerous racemose or clustered, small heads of yellow flowers; heads few to many flowered; bracts of the involucre narrow, thin or chartaceous, without herbaceous tips, imbricated in about 2 series; receptacle naked; achenes terete, 5-12-nerved; pappus dull white, of unequal capillary bristles.

Herbage very smooth, glabrous.
  Involucre 5 or 6 mm. high; lower leaves broadly spatulate or obovate................... 1. *S. spathulata.*
  Involucre 3 or 4 mm. high; leaves lanceolate or oblong .... 2. *S. confinia.*
Herbage rough or cinereous-pubescent............... 3. *S. californica.*

1 **S. spathulata** DC. Near Santa Barbara, *Mrs. Brandegee.*

2. **S. confinis** Gray. In moist places from Lower California to Los Angeles, from near sea level to 2,300 m. altitude.

3. **S. californica** Nutt. In dry open places from the lower foothills to 3,000 m. altitude.

14. EUTHAMIA.

Erect glabrous perennial herbs with creeping rootstocks; leaves alternate, narrow, entire, pellucid-punctate; heads small, glomerately cymose, many-flowered; bracts of the involucre firm, imbricated, glutinous; ray-flowers more numerous than those of the disk; achenes short, turbinate, villous-pubescent; receptacle fimbriolate.

1. **E. occidentalis** Nutt. Frequent in low moist ground and along streams, at lower altitudes throughout our region.

15. STENOTUS.

Evergreen, glabrous, resinous-punctate, shrubs or suffrutescent plants with narrow entire leaves and large heads of yellow flowers terminating the branchlets; bracts of the hemispheric involucre little imbricated, in 1 or 2 series, membranous, with scarious margins; ray-flowers several to many, pistillate and fertile; disk-flowers numerous, perfect; achenes oblong, compressed, densely villous; pappus of numerous white slender bristles.

Branches stout, woody; leaves much crowded, linear, acute; involucral bracts oblong, acuminate, greenish, the inner having scarious fimbriolate margins	1. *S. linearifolius.*
Branches green, slightly puberulent; leaves linear, fleshy, glandular-punctate; involucral bracts linear, attenuate, glandular-graniferous	2. *S. interior.*

1. **S. linearifolius** T. & G. Common in a few places along the western bases of the San Jacinto and San Bernardino Mts. at about 900 m. altitude; rare at Mono Creek, Santa Barbara Co.; may be expected at intermediate points.

2. **S. interior** (Coville). Arid places, especially in the desert area; common in Antelope Valley from Mohave to Cajon Pass; San Felipe and Witch Creek, San Diego Co.; east to Arizona and Utah.

16. PYRROCOMA.

Perennial herbs from thick taproots with alternate, sometimes spinulose-toothed leaves and showy heads of yellow flowers in terminal cymose or paniculate clusters or solitary, rarely sessile; involucres hemispheric, the bracts more or less herbaceous; receptacle flat; ray-flowers yellow, fertile or sterile; disk-flowers yellow, perfect; style-appendages linear-subulate; achenes linear, 3-angled, striate; pappus tawny or reddish, of numerous rigid bristles.

Herbage tomentose when young; lower leaves oblanceolate, entire or serrate; the upper narrow, entire; involucral bracts linear-acuminate, without distinct green tips; rays about 20; achenes oblong, canescent........... 1. *P. gossypina.*
Herbage glabrous; lower leaves thick, lanceolate, acute, sometimes spinulose-toothed; the upper small, entire, ciliolate; involucral bracts linear-spatulate with obtuse mucronate herbaceous tips; rays 8-16; achenes rarely pubescent. 2. *P. paniculata virgata.*

1. **P. gossypina** Greene. Bear Valley, San Bernardino Mts.; apparently very local.

2. **P. paniculata virgata** (Gray). Dry Lake, near Rosamond, Los Angeles Co., *Davy,* 1896.

17. SIDERANTHUS.

Annual or perennial herbs with alternate, pinnatifid (in ours) spinulose-tipped leaves and numerous rather large heads of yellow flowers; involucre campanulate or hemispheric; many-flowered, the bracts well imbricated and bristle-tipped; receptacle naked; achenes obtuse, compressed, sericeous, 8-10-nerved; pappus of 1 or more series of unequal bristles, persistent.

Annual; herbage canescent, rarely glabrate; lower leaves oblanceolate, pinnatifid, the upper entire or toothed; involucral bracts linear .... 1. *S. gracilis*
Perennial.
  Herbage nearly glabrous; leaves linear, pinnatifid; involucral bracts well imbricated, green; rays pale yellow........................ 2. *S. junceus.*
  Herbage glandular or scabrous, floccose when young; leaves broader, pinnatifid to bipinnatifid; involucral bracts linear-lanceolate, villous-canescent; rays bright yellow .... 3. *S. spinulosus.*

1. **S. gracilis** Rydb. Providence Mts., eastern part of the Mohave Desert; Lower California to Arizona and Utah.

2. **S. junceus** (Greene). Southwestern San Diego Co. and southward into Lower California.

3. **S. spinulosus** Sweet. From Saskatchewan to Lower California.

18. ERICAMERIA.

Evergreen shrubs with resinous-dotted mostly linear or terete leaves and terminal cymose, corymbose or paniculate clusters of small heads; involucre turbinate or campanulate, the bracts well imbricated, margins subscarious; ray-flowers yellow, few or none; disk-flowers widening upward, deeply 5-toothed, yellow; style-appendages filiform or slender-subulate, except in *E. monactis;* achenes slender; pappus-bristles slender, scabrous, dull white or yellowish, becoming reddish.

Style-appendages oblong-ovate, acute; involucral bracts 8-10; rays 1 or 2 or none; leaves flat, linear, acute .... 1. *E. monactis.*
Style-appendages filiform-subulate; involucral bracts more numerous.
  Heads radiate; leaves filiform.
    Achenes glabrous .... 2. *E. ericoides.*
    Achenes pubescent.
      Outer involucral bracts obtuse................ 3. *E. Palmeri.*
      Outer involucral bracts acuminate; vernal heads solitary .... 4. *E. pinifolia.*
  Heads discoid.
    Heads in close terminal cymes.
      Leaves flat.
        Leaves broadly linear to lanceolate......... 5. *E. Parishii.*
        Leaves thick, cuneate-obovate to spatulate-obovate, mucronate .... 6. *E. cuneata.*
      Leaves filiform to narrowly linear............. 7. *E. arborescens.*
    Heads in loose panicles or racemes; leaves filiform.
      Leaves 12 mm. or less long; heads 6-8-flowered. 8. *E. Cooperi.*
      Leaves 12-24 mm. long; heads 8-12-flowered.... 9. *E. brachylepis.*

1. **E. monactis** McClatchie. Upper part of the Lower Sonoran Zone; Mohave Desert; Antelope Valley; Rubio Canyon, *McClatchie.*

2. **E. ericoides** Jepson. Common in the Upper Sonoran Zone along the coast from Los Angeles Co. northward.

3. **E. Palmeri** Hall. Common in the foothills and on the plains west of the mountains.

4. **E. pinifolia** Hall. Foothills from Newhall to the Cuyamaca and Laguna Mts. of San Diego Co. Common in the chaparral belt.

5. **E. Parishii** Hall. Upper Sonoran Zone; San Gabriel and San Bernardino Mts.; Santa Ana Mts.; San Pedro Martir, Lower California, *Robertson;* Waterman Canyon, type locality.

6. **E. cuneata** Greene. Rocky ledges in the mountains extending into Lower California; Rubio Canyon.

7. **E. arborescens** Greene. Upper Sonoran Zone; Santa Barbara; Santa Lucia Mts., northward in the coast ranges.

8. **E. Cooperi** Hall. Known only from the Providence Mts. of eastern San Bernardino Co.

9. **E. brachylepis** Hall. Southwestern San Diego Co.; extending southward into Lower California.

19. CHRYSOTHAMNUS.

Shrubby or suffrutescent plants with hard wood, narrow or terete entire leaves and white-tomentose or glabrous, often viscid or resinous herbage; inflorescence paniculate, cymose, or rarely racemose; heads homogamous; involucre narrow, its bracts well imbricated usually in vertical ranks, chartaceous or coriaceous, with or without herbaceous tips; ray-flowers none; disk-flowers yellow, 5-30; style-branches subulate or filiform, long-exserted; achenes narrow, terete or slightly angled, pubescent; pappus copious, soft, dull white or reddish.

Branches glabrous.
Herbage resinous-punctate; leaves terete.
Outer involucral bracts with a distinct greenish subapical spot .... 1. *C. teretifolius.*
Involucral bracts pale, wholly naked........... 2. *C. paniculatus.*
Herbage not resinous-punctate; leaves narrow but plane or canaliculate.
Stems leafy; involucres 5-8 mm. high.
Leaves twisted, serrulate-ciliolulate........... 3. *C. tortifolius.*
Leaves not twisted, mostly 3-nerved, 2 mm. or less wide, margins ciliate.............. 4. *C. stenophyllus.*
Nearly leafless; involucre about 1 cm. high; glabrate form of...................... 5. *C. mohavensis.*
Branches densely white-tomentose.
Leaves few; involucral bracts obtuse, the vertical ranks distinct .... 5. *C. mohavensis.*
Leaves numerous.
Heads 5-flowered.
Involucral bracts abruptly contracted to a spreading setiform tip or short awn..... 6. *C. ceruminosus.*
Involucral bracts not abruptly tipped.
Mature leaves glabrous.
Bracts oblong to linear-lanceolate; corolla-teeth short .... 7. *C. graveolens.*
Bracts lanceolate, acuminate, carinate; corolla-teeth lanceolate, rather long..... 8. *C. occidentalis.*
Leaves loosely white-tomentose; bracts lanceolate, acute, carinate; style-branches subulate-filiform, longer than the stigmatic portion .... 9. *C. nauseosus.*
Heads about 9-flowered; involucral bracts acuminate, more or less foliaceous; achenes sericeous-pubescent ....10. *C. Parryi.*

1. **C. teretifolius** Hall. Dry plains and hills of the Desert Area; Antelope Valley; Whitewater and Palm Springs, *Parish;* east to Arizona and Nevada.

2. **C. paniculatus** Hall. Lower Sonoran Zone on both the Mohave and Colorado Deserts.

3. **C. tortifolius** Greene. Mt. Pinos, Ventura Co.; Tejon Pass; Bear Valley, San Bernardino Mts.

4. **C. stenophyllus** Greene. Near Acton, Los Angeles Co., *Hasse.*

5. **C. mohavensis** Greene. Mohave Desert, apparently rare.

6. **C. ceruminosus** Greene. Collected only by *Dr. Heermann,* somewhere near Tejon Pass.

7. **C. graveolens** *Greene.* Common in the arid Upper Sonoran Zone of western North America. Antelope Valley; Saugus, Los Angeles Co.; near Colton, San Bernardino Co. *Rabbit Brush.*

8. **C. occidentalis** Greene. Transition and Canadian Zones. Little Green Valley, Bluff Lake, and Barton Flats, San Bernardino Mts.; Round Valley, San Jacinto Mt., *Hall.*

9. **C. nauseosus** Britton. Alberta and Washington south to Southern California. Strawberry Peak, *Parish;* Bear Valley.

10. **C. Parryi** Greene. Alamo Mt., Ventura Co., at 2,100 m. altitude, *Hall.*

20. ISOCOMA.

Rigid erect suffrutescent plants with thickish closely sessile leaves and a corymbose terminal cluster of small rayless heads; involucral bracts coriaceous, closely imbricated, the tips appressed-herbaceous; flowers permanently yellow; corolla-tube slender with ventricose limb, the segments more or less connivent about the style; style-appendages subulate-lanceolate or broader; achenes short, broadened upwards, longitudinally striate or ribbed, silky-pubescent; pappus of numerous scabrous bristles, the innermost longest and often flattened.

Herbage minutely scabrous to arachnoid-villous; involucre 15-35 flowered; bracts with green tips and ciliate or erose white margins; achenes linear-turbinate .... 1. *I. vernonioides.*
Herbage glabrous and glutinous; involucres 6-10 flowered, corymbose-clustered; bracts oblong, obtuse, with a conspicuous gland; achenes strigose .... 2. *I. acradenia.*

1. **I. vernonioides** Nutt. Common on dry hillsides and plains; Los Angeles; Santa Monica; Santa Ana Mts.; San Joaquin Hills.

2. **I. acradenia** Greene. Arid Lower Sonoran Zone; Antelope Valley; Mohave Desert; Colorado Desert; north to the San Joaquin Valley.

21. HAZARDIA.

Shrubs or suffrutescent plants with brittle ascending stems and alternate, coriaceous, entire to spinulose-serrate leaves; herbage tomentose, or glandular, or glabrous, never resinous-punctate; heads 20-40 flowered; involucre oblong or turbinate, the bracts numerous and closely imbricated; rays yellow, changing to purple or none; disk-corollas yellow, changing to brownish-purple; style-tips slender, almost terete, minutely pubescent; achenes linear, 4-6 nerved; pappus reddish.

- Herbage white-tomentose; tips of involucral bracts erect; rays inconspicuous or wanting... 1. *H. cana.*
- Herbage green.
  - Rays none.
    - Heads racemose or paniculate; involucres 10-12 mm. high, the bracts squarrose-spreading; achenes glabrous or sparsely pubescent. 2. *H. squarrosa.*
    - Inflorescence sessile-glomerate or spicate; involucres more than 12 mm. high, the bracts truncate, short cusped; achenes glabrous .... 3. *H. obtusa.*
  - Rays present.
    - Leaves entire, acute, punctate; rays short, yellow .... 4. *H. Orcuttii.*
    - Leaves oval, obtuse, spinulose, semi-amplexicaul; bracts obtuse; rays numerous, showy.... 5. *H. berberidis.*

1. **H. cana** Greene. Guadalupe, San Clemente, Santa Cruz, Santa Rosa, and probably other of the coast islands.

2. **H. squarrosa** Greene. Occasional in the chaparral belt west of the mountains, from San Diego to Monterey; also on the Santa Barbara Islands.

3. **H. obtusa** Greene. Known only from San Emigdio Canyon, Kern Co., but may be expected along our northern border.

4. **H. Orcuttii** Greene. Northern Lower California and may be expected on our southern border.

5. **H. berberidis** Greene. About the same range as the last.

22. LESSINGIA.

Herbaceous plants with alternate, more or less serrate leaves and small cymosely panicled heads of yellow, purplish or white flowers; involucres campanulate to turbinate, 5-25 flowered, the bracts with mostly distinct green tips, imbricated in several appressed ranks; receptacle flat, alveolate; corollas with slender tube and long narrow lobes, either all regular or the outer ones enlarged and more deeply cleft on the inner side, the ligule-like limb 5-lobed; anthers with slender subulate appendages; style-branches obtuse or truncate, densely hispid, with a conspicuous cusp among the hairs; achenes all fertile, turbinate or cuneate, flattened, silky-villous; pappus reddish-brown, of scabrous rigid bristles.

Outer corollas enlarged and irregularly cleft.
Stems branching from the base.
Herbage minutely glandular; involucral bracts white-woolly; outer flowers pink........ 1. *L. heterochroma.*
Herbage not glandular; flowers all yellow.
Style-branches truncate-obtuse................ 2. *L. germanorum.*
Style-branches linear-subulate................ 3. *L. Lemmoni.*
Herbage densely glandular; flowers white........ 4. *L. albiflora.*
Stems erect, branching only above the base; herbage and involucres bearing yellow tack-shaped glands; flowers yellow........... 5. *L. glandulifera.*
Corollas all regular (or nearly so) and alike, yellow; var. tenuis of........................ 6. *L. ramulosa.*

1. **L. heterochroma** Hall. Dry soil of the Upper Sonoran Zone. Lockwood Valley, Mt. Pinos, Ventura Co., *Hall;* type locality.

2. **L. germanorum** Cham. Coast of San Luis Obispo Co., and may be expected to reach our limits.

3. **L. Lemmoni** Gray. Eastern California and Arizona.

4. **L. albiflora** Eastwood. Rose Station, Kern Co., and may reach our region.

5. **L. glandulifera** Gray. Common on plains of the Upper Sonoran Zone.

6. **L. ramulosa tenuis** Gray. Collected by *Rothrock,* at the "head of Peru Creek" (probably Piru Creek, Ventura Co.), at 1,550 m. altitude, acc. to Gray.

23. CORETHROGYNE.

Perennial herbs, some suffrutescent at base, covered when young with a white-woolly tomentum which is often deciduous in age; leaves alternate, entire or serrate; heads solitary, or cymose, or paniculate; involucre hemispheric to turbinate, its bracts well imbricated with green or herbaceous tips; ray-flowers violet-blue or purple; anthers tipped with subulate appendages; style-appendages flat, truncate, comose or with a bearded tuft; achenes pubescent, those of the ray sterile; pappus of the disk reddish-brown, of the ray reduced or wanting.

Varieties of C. filaginifolia.

Tomentum deciduous from the inflorescence at the time of flowering.
Inflorescence minutely if at all glandular; typical..*C. filaginifolia.*
Inflorescence densely glandular and viscid.
Heads small; involucre about 8 mm. high.
Stems tall and slender; heads in loose panicles or racemes.
Seacoast form with numerous heads.........Var. *virgata.*
Interior form with few long-peduncular heads ....Var. *bernardina.*
Stems low and stout.
Inflorescence paniculate.
Montane form with erect stems..........Var. *rigida.*
Insular form with depressed or ascending stems ....Var. *robusta.*
Inflorescence virgate, sparsely branched, foliaceous with broad leaves...............Var. *glomerata.*
Heads large; involucre 10-12 mm. high.........Var. *pacifica.*
Tomentum persistent, even the involucre white at the time of flowering.
Leaves broadly oblong, rigid......................Var. *latifolia.*
Leaves linear, flaccid..........................Var. *linifolia.*

1. **C. filaginifolia** Nutt. Near the coast from Monterey southward, the typical form rare south of Santa Barbara.

Var. **latifolia** Hall. Oxnard, Ventura Co., *Davy;* the type locality.

Var. **virgata** Gray. The common form along the coast from San Diego north to Monterey.

Var. **bernardina** Hall. The common form of the foothills and plains back from the coast.

Var. **linifolia** Hall. About one kilometer south of Del Mar, San Diego Co., *Mrs. Brandegee;* the type locality.

Var. **rigida** Gray. In dry soil in the mountains from Mt. San Jacinto to the Sierras of Tulare Co.

Var. **robusta** Greene. San Miguel Island and Prince's Island, *Greene.*

Var. **glomerata** Hall. Oak Glen, near Redlands, *Robertson;* Forest Home, San Bernardino Mts.

Var. **pacifica** Hall. Pacific Beach, near San Diego, *Purpus;* Del Mar, *Mrs. Brandegee.*

In this genus we have followed the excellent treatment of Prof. Hall, in his Compositae of Southern California.

24. PSILACTIS.

A leafy-stemmed desert annual with rather small, solitary or loosely racemose, heterogamous heads; involucre hemispheric, the bracts unequal and closely imbricated in 2-3 series; ray-flowers pistillate, frequently infertile; disk-flowers perfect, fertile; achenes compressed, pubescent; pappus of ray-flowers an obscure ring or none, of disk-flowers a row of slender bristles.

1. **P. Coulteri** Gray. Lower Sonoran Zone, Mohave Desert to southern Arizona.

25. MONOPTILON.

Depressed desert annual with short radiating or ascending branches and upturned heads of daisy-like flowers; involucre hemispheric, of numerous narrow bracts in a single series; receptacle flat, naked; rays conspicuous, white or sometimes tinged with rose; achenes oblong-obovate, compressed; pappus a short, cup-shaped, denticulate crown and a single awn, which is barbellate or plumose near the apex.

1. **M. bellidiforme** T. & G. On dry plains of the Lower Sonoran Zone in the Mohave Desert, east to Utah.

26. EREMIASTRUM.

Dwarf, depressed annuals with entire leaves and solitary heads; involucre hemispheric or broader, the bracts numerous, linear, nearly in a single series, herbaceous, with hyaline-scarious fimbriate margins; receptacle flat; ray-flowers white, numerous, pistillate; disk-flowers yellow, perfect; achenes obovate oblong, compressed, 2-nerved; pappus of 3-12 oblong or cuneate somewhat setose paleae and 1-12 slender bristles.

1. **E. bellioides** Gray. Sandy soil of the Lower Sonoran Zone of the desert area, east into Utah and Arizona. Type collected by George Thurber in southeastern Imperial Co.

27. ASTER.

Perennial, or rarely annual, branched herbs with leafy stems, sessile or petiolate leaves, and corymbose, paniculate, or racemose heads; involucre turbinate or campanulate to hemispheric, the bracts more or less imbricated, appressed or spreading, with herbaceous tips; ray-flowers purple, blue, or white, fertile; disk-flowers yellow, changing to purple or brown, tubular, the limb funnel-form and shortly 5-toothed; receptacle flat or convex, alveolate, achenes more or less compressed; pappus of capillary bristles in a single series.

Perennial.
Stems leafy; polycephalous except forms of Nos. 9 and 10.
Involucral bracts closely imbricated with broad tips.
Inflorescence distinctly cymose; insular species with coriaceous leaves................. 1. *A. radulinus.*

Inflorescence racemose or paniculate.
Plants over 35 cm. high; valleys and foothills.
Herbage rough-pubescent or almost glabrous; inflorescence mostly condensed; leaves rigid .... 2. *A. Menziesii.*
Herbage soft-pubescent or glabrous; inflorescence mostly rather loose.
Rameal leaves linear, 6 mm, or less wide.
Inflorescence with minute rigid bracts; leaves early deciduous............ 3. *A. defoliatus.*
Inflorescence leafy-bracted .... 4. *A. bernardinus.*
Rameal leaves lanceolate, mostly 8-20 mm. wide .... 5. *A. chilensis.*
Plant 15-30 cm. high; mountains above 1,200 m.; var. Parishii of.................. 8. *A. Fremonti.*
Involucral bracts narrowed above to a point, not closely imbricated.
Principal leaves broadly lanceolate or wider; plant 4-7 dm. high; foothill canyons.... 6. *A. Greatai.*
Principal leaves narrowly lanceolate to linear.
Plant 6-20 dm. high; heads numerous....... 7. *A. hesperius.*
Plant 1.5-6 dm. high; heads rather few; mountains above 1,200 m.
Leaves not sheathing; var. Parishii of... 8. *A. Fremonti.*
Leaves sheathing the stem, elongated...... 9. *A. delectabilis.*
Plant .5-1 (rarely 1.8) dm. high; leaves abruptly apiculate; heads solitary; achenes canescent ....10. *A. deserticola.*
Stems leafless except at base, monocephalous; high mountain species ....11. *A. Andersonii.*
Annual; inflorescence paniculate; bracts linear, acute, scarious-margined; rays 3 mm. long....12. *A. exilis.*

1. **A. radulinus** Gray. Santa Cruz Island, *Greene;* Monterey Co. to Washington and Nevada.

2. **A. Menziesii** Lindl. Dry ground throughout western California; not common in our region. Antelope Valley, 1895; Los Angeles; Cuyamaca Mts., *Brandegee.*

3. **A. defoliatus** Parish. Known only from the type collection; in a meadow at San Bernardino, Oct. 17, 1903, *Parish.*

4. **A. bernardinus** Hall. San Bernardino, *Parish;* Orange Co., *Hamlin;* Cienega; near Pomona, *Davy;* El Monte; near Santa Ana.

5. **A. chilensis** Nees. Rare in our region, perhaps not occurring south of Santa Barbara Co.; Carpinteria, *Hall;* Santa Rosa Island, *Brandegee.*

6. **A. Greatai** Parish. Not uncommon in Upper Sonoran Canyons of the San Gabriel Mts. Eaton Canyon, type locality.

7. **A. hesperius** Gray. Upper Sonoran Zone, in meadows and other moist places.

8. **A. Fremonti Parishii** Gray. Occasional in meadows of the Transition Zone, San Bernardino Mts.; San Jacinto Mts.; San Gabriel Mts.

9. **A. delectabilis** Hall. Open marshy meadow on a tributary of Mill Creek, San Bernardino Mts., *R. J. Smith.*

10. **A. deserticola** Macbr. Mohave Desert, San Bernardino Co., *Mary F. Spencer.*

11. **A. Andersonii** Gray. Tahquitz Valley, San Jacinto Mts., and to be expected in the upper Transition Zone of the San Bernardino Mts.

12. **A. exilis** Ell. A common weed along river bottoms and wet, waste places generally.

28. XYLORRHIZA.

Perennial caulescent herbs, with thick woody tap-roots and short caudices; leaves many, spinulose-tipped, entire or spinulose-toothed; heads large, solitary at the ends of the branches, radiate involucres hemispheric, the bracts mostly in 2-3 series, acuminate, herbaceous, carinate below; ray-flowers pistillate, the ligules white or pinkish; disk-flowers perfect; style-appendages lanceolate acute; achenes oblong, compressed; pappus fulvous, simple, of few coarse bristles.

Herbage tomentose; leaves linear to oblong, attenuate to a sharp point, entire to incisely pinnatifid; involucral bracts linear-attenuate, imbricated in 2 or 3 unequal series; rays lavender; achenes villous............... 1. *X. tortifolia.*

Herbage glabrous.

  Leaves ovate-lanceolate with 2 or 3 triangular teeth on each side, the upper sessile by a narrow base, apex acute; outer involucral bracts green, linear-lanceolate, 1 mm. wide, 15 mm. long, the inner twice as broad with hyaline margins slightly lacerate and minutely glandular; rays 2.5 cm. long, light lavender; achenes very broad and very villous................ 2. *X. Standleyi.*

Leaves obovate to oblong, obtuse and cuspidate or acute, the upper sessile by a broad base; involucral bracts closely imbricate, with elongated slender green tips, the margins usually ciliate below; rays 2 cm. long, purple to delicate mauve; achenes white villous .... 3. *X. Orcuttii.*

1. **X. tortifolia** Greene. Stony soil of the Lower Sonoran Zone of the Mohave and Colorado Deserts, north and east to Inyo Co. and Nevada. *Desert Aster.*

2. **X. Standleyi** Davidson. Colorado Desert. Type collected at Painted Canyon, near Mecca, by *F. M. Fultz.*

3. **X. Orcuttii** Greene. Lower Sonoran Zone of the Colorado Desert. *Orcutt Aster.*

29. LEUCOSYRIS.

Rush-like spiny plants, often woody at base, with small, linear or subulate, often deciduous leaves; involucres hemispheric, the bracts well imbricated in 3 series, subulate; ray-flowers pistillate and fertile, with short white ligules, or none; disk-flowers perfect, yellow; style-appendages triangular-subulate, much shorter than the stigmatic part.

Rays white, 3 mm. long; involucral bracts lanceolate, acute, brown or greenish with a scarious border; achenes glabrous.............. 1. *L. spinosa.*

Rays none; involucral bracts chartaceous, with a greenish midrib; achenes sericeous-pubescent .... 2. *L. carnosa.*

1. **L. spinosa** Greene. Southern San Diego Co., Colorado Desert and east to Texas. *Mexican Devil-weed.*

2. **L. carnosa** Greene. Lower Sonoran Zone of the Mohave Desert and Inyo Co. Not common.

30. MACHAERANTHERA.

Annual, biennial or short-lived perennial, leafy, caulescent herbs, with tap-roots, never with rootstocks; leaves alternate, bristle-tipped, from simple and dentate to bipinnately parted into linear segments; heads corymbose or paniculate, radiate; involucres hemispheric or turbinate, the bracts imbricated in several series, with narrow herbaceous, often spreading tips; receptacle pitted, the pits having toothed or lacerate edges; ray-flowers numerous, pistillate, the rays purple or violet; disk-flowers perfect, the corollas yellow, turning red or brown; achenes turbinate, pubescent or glabrate; pappus of numerous firm, tough bristles.

Annual or biennial; tips of involucral bracts erect.

  Herbage finely pubescent; leaves pinnately parted or cleft; involucral bracts linear acuminate with scarious base and viscid-pubescent green tips; achenes striate, canescently villous .... 1. *M. tanacetifolia.*

Herbage glabrous, viscid; leaves simply pinnatifid; involucral bracts linear-oblong, the green tips ovate-acute; achenes sericeous...... 2. *M. parviflora.*

Biennial or perennial; outer bracts of the involucre with subulate recurved tips.

Herbage minutely pubescent; lower leaves oblanceolate, spinose-dentate, the upper linear and entire; achenes narrowed below, pubescent .... 3. *M. canescens.*

Herbage canescent; involucral bracts with long attenuate herbaceous tips; achenes canescent .... 4. *M. tephrodes.*

1. **M. tanacetifolia** Nees. Providence Mts., thence east and south.

2. **M. parviflora** Gray. Western Arizona, and may be expected to reach our borders.

3. **M. canescens** Gray. San Bernardino and San Antonio Mts.; South Fork, Santa Ana River; Frazier Mt. and Mt. Pinos, Ventura Co.; Providence Mts.

4. **M. tephrodes** Greene. San Jacinto Valley; Colorado Desert and east into Arizona and New Mexico.

31. LEUCELENE.

Low perennial with leafy stems from a woody base; heads small, solitary and terminal on the simple stems or branchlets; involucre campanulate, the bracts closely imbricated, herbaceous with scarious margins; rays white or reddish; achenes slender, compressed, pubescent; pappus a single series of scabrous white bristles.

1. **L. ericoides** Greene. Tahquitz Peak, San Jacinto Mts., *Hall;* Providence Mts., *Mrs. Brandegee.*

32. ERIGERON. FLEABANE.

Herbs, with entire or toothed mostly sessile leaves and solitary or cymose or rarely paniculate heterogamous heads; involucre campanulate or hemispheric, the bracts narrow, equal, little imbricated; receptacle flat or convex, naked; disk-flowers yellow; ray-flowers numerous, the ligules white to purple, rarely wanting; achenes flattened, usually pubescent and striate; pappus a single series of bristles or with an outer series of short bristles or inconspicuous paleae.

Rays conspicuous, surpassing the disk.

Involucre 2 cm. or more wide; leaves over 1.5 cm. wide; submaritime perennial .... 1. *E. glaucus.*

Involucre and usually also the leaves, much narrower.
Plants low, mostly under 3 dm., simple or diffusely branched.
Leaves entire.
Root perennial.
Herbage canescent or silvery with a soft appressed pubescence.
Pappus double; stems stout, silvery-white .... 2. *E. Parishii.*
Pappus simple; stems slender, merely canescent .... 3. *E. linearis.*
Herbage green or cinereous with a harsh pubescence.
Stems crowded on a thick multicipital caudex; pappus double, the outer series short .... 4. *E. concinnus.*
Stems from slender rootstocks; pappus simple .... 6. *E. sanctarum.*
Root annual or biennial; heads loosely cymose .... 12. *E. divergens.*
Leaves ternately parted .... 5. *E. compositus.*
Plants tall, mostly 3-6 dm., cymosely branching above.
Leaves linear to filiform; rays 30 to 40 or 80.
Involucre pubescent.
Herbage cinereous with spreading hairs .... 7. *E. Breweri.*
Herbage (especially the leaves) strigose pubescent .... 8. *E. foliosus.*
Involucre glabrous .... 9. *E. striatus.*
Leaves broadly spatulate to oblong or ovate; rays much over 100, pink or white .... 10. *E. Philadelphicus.*
Rays inconspicuous or none.
Perennial; 3 dm. or less high.
Leaves entire: var. aphanactis of .... 3. *E. concinnus.*
Leaves trifid: var. discoideus of .... 5. *E. compositus.*
Annual; 3-20 dm. high (unless depauperate); branched from the base; heads long-peduncled; pappus double .... 11. *E. incomptus.*

1. **E. glaucus** Ker. Common on San Miguel Island, *Greene;* along the sea-shore further north, but not reported on the mainland of Southern California. *Seaside daisy.*

2. **E. Parishii** Gray. Stony hillsides at Cushenberry Springs, on the desert base of the San Bernardino Mts., *Parish.*

3. **E. concinnus** T. & G. Providence Mts., Mohave Desert, *Brandegee;* Sierra Nevada and Rocky Mts.

Var. *aphanactis* Gray. San Bernardino Mts., from the Transition Zone of Bear Valley to the Alpine Zone of Mt. San Gorgonio.

4. **E. linearis** Piper. Providence Mts., Mohave Desert, *Brandegee;* eastern Sierra Nevadas to British Columbia.

5. **E. compositus** Pursh. Summit of Mt. San Gorgonio.

Var. *discoideus* Gray. With the species on San Gorgonio.

6. **E. sanctarum** Wats. Santa Inez Mts., Santa Barbara Co., *Brandegee;* near the boundary between Santa Barbara and San Luis Obispo Co's., *Miss Eastwood.*

7. **E. Breweri** Gray. Arid portion of the Sierra Nevada Mts.; Hesperia, Mohave Desert, *Parish.*

8. **E. foliosus** Nutt. Common on the hills and in the mountains up to 2,100 m. altitude throughout the state.

Var. *stenophyllus* Gray. Leaves 2 mm. or less wide, often filiform. Common in dry, exposed places.

Var. *tenuissimus* Gray. Slender; leaves nearly all filiform, erect or ascending, the upper gradually shorter and becoming setaceous-subulate; heads much smaller. Along the Mexican border.

Var. *Blochmanae* Hall. Stout; canescent with a soft pubescence; heads short-peduncled in a terminal cyme; rays 50-60; achenes nearly or quite glabrous. A seashore form. Northern Santa Barbara Co., *Mrs. Blochman; Miss Eastwood.*

9. **E. striatus** Greene. Houston Flat, San Bernardino Mts., *Dr. W. R. Shaw.*

10. **E. Philadelphicus** L. Along streams and in springy places throughout the Upper Sonoran and Lower Transition Zones, but not common.

11. **E. incomptus** Gray. Carysito, Lower California, *Orcutt;* Tia Juana River, San Diego Co., *Miss Stokes.*

12. **E. divergens** T. & G. Lower California, *Brandegee;* San Diego Co.; San Bernardino Mts.; Palm Springs; San Antonio Mts.

33. LEPTILON.

Annual or biennial herbs with small heads of white flowers in panicles or racemes; involucre campanulate, the bracts narrow, in 2 or 3 series; rays small, shorter than the diameter of the disk, pistillate, or none; disk-flowers perfect, 4-toothed or -lobed; achenes compressed; pappus uniseriate. (*Erigeron* in part.)

Plant 2 m. or less high, much branched; herbage hispid-pubescent to glabrate; heads small, numerous, about 4 mm. high; bracts linear, acute, glabrate; rays white, shorter than the pappus........................ 1. *L. canadense.*

Plant 2-7 dm. high; herbage hispid and scabrous; heads in a loose panicle, 4-5 mm. high; bracts linear-subulate, pubescent; rays minute .... 2. *L. linifolium.*

1. **L. canadense** Britton. A common weed, in waste places and cultivated fields.

2. **L. linifolium** Small. Becoming a common wayside weed. Introduced from the tropics.

34. ESCHENBACHIA.

Herbs, or rarely shrubs, with alternate leaves and rather small heads mostly in cymes or racemes; involucral bracts 1-3 series, often with membranaceous margins; receptacle naked; pistillate flowers in two or more outer circles, their corollas reduced to a short-filiform tube much shorter than the style; perfect flowers central, mostly fertile; achenes small, compressed; pappus a single series of soft capillary bristles. *(Conyza.)*

1. **E. Coulteri** Rydb. Lower and upper Sonoran zones from the San Joaquin Valley to Mexico; rare in our region; Santa Cruz Island, *Greene;* Catalina Island; Azusa.

35. BACCHARIS.

Dioecious perennial herbs or shrubs with alternate leaves and small paniculate or corymbose heads of tubular flowers; involucre imbricated; receptacle flat; corolla of the pistillate flowers slender, truncate or minutely toothed, that of the staminate tubular, 5-lobed; achenes more or less compressed, striate; pappus of the pistillate flowers copious, capillary, becoming elongated in fruit, that of the staminate flowers shorter.

Evergreen shrubs.
- Leaves all less than 5 cm. long.
  - Receptacle naked; pappus of fertile flowers copious, becoming 6 to 12 mm. long.
    - Leafy up to the glomerate heads with obovate obtuse leaves .... 1. *B. pilularis.*
    - Less leafy; leaves mostly linear or oblong.
      - Pappus of sterile flowers bearded at tip; of fertile flowers 10 to 12 mm. long....... 2. *B. Emoryi.*
      - Pappus of sterile flowers naked at tip; of fertile flowers 6 to 8 mm. long........ 3. *B. sarothroides.*
  - Receptacle chaffy; pappus of fertile flowers scanty, 3 mm. or less long............ 4. *B. sergiloides.*
- Leaves 5 to 12 cm. long (except a few upper ones), willow-like.
  - Cymes terminating main branches; leaves denticulate, 3-nerved; stems herbaceous above. 8. *B. glutinosa.*

Cymes terminating short lateral branchlets; leaves mostly entire inconspicuously 3-nerved; stems shrubby throughout............. 9. *B. viminea.*
Herbaceous perennials, the base sometimes woody.
  Herbage pubescent; leaves linear.
    Leaves very small, entire...................... 5. *B. brachyphylla.*
    Leaves 2 to 5 cm. long, acutely serrate.......... 6. *B. Plummerae.*
  Herbage glabrous but resinous; leaves lanceolate... 7. *B. Douglasii.*

1. **B. pilularis** DC. Upper Sonoran Zone; near Santa Monica; San Miguel Island, *Greene;* more common from Monterey northward.

2. **B. Emoryi** Gray. Moist places of the Lower and Upper Sonoran Zones; Los Angeles; Riverside; San Diego; Colorado Desert; to Arizona, Nevada and Utah.

3. **B. sarothroides** Gray. Southwestern San Diego Co. to Arizona and Mexico.

4. **B. sergiloides** Gray. In dry creek-beds of the Lower Sonoran Zone from the east base of Mt. San Jacinto across the Colorado and Mohave Deserts to Nevada and Utah.

5. **B. brachyphylla** Gray. Southern San Diego Co. to Arizona.

6. **B. Plummerae** Gray. Upper Sonoran Zone, in canyons near the sea; near Santa Monica; Topango; Santa Cruz Island, *Greene.*

7. **B. Douglasii** DC. Occasional in damp soil along streams of the Upper Sonoran Zone from San Diego Co. to middle California.

8. **B. glutinosa** Pers. Moist ground of the Upper and Lower Sonoran Zones from Butte Co. to San Diego, east and south to Colorado and Mexico; Ballona Marshes, Los Angeles Co., *Chandler;* Santa Ana River, near Riverside, *Koethen;* Banning, *Parish.*

9. **B. viminea** DC. Lower and Upper Sonoran Zones; common along ditches and in waste places, especially on low, damp ground.

III. GNAPHALIEAE.

Involucral bracts many; receptacle naked.
  Herbaceous, or only the base woody.
    Herbage densely woolly.
      Flowers dioecious; low perennials of high altitudes ....44. ANTENNARIA.
      Flowers all fertile but of 2 sorts, perfect and pistillate, borne on the same head......45. GNAPHALIUM.
    Herbage merely glandular-puberulent............36. PLUCHEA.

Shrub, with wand-like stems; herbage silvery with appressed hairs ....37. Berthelotia.
Involucral bracts few or none; receptacle chaffy.
Bracts completely enclosing their achenes; pappus none.
Corolla and style lateral; achene gibbous........38. Micropus.
Corolla and style apical; achene straight or somewhat curved.
Leaves alternate; receptacle columnar.
Paleae subtending the central flowers hyaline and deciduous; involucral bracts in several series ....39. Stylocline.
Paleae subtending the central flowers coriaceous-herbaceous, ending in a hooked spine; involucral bracts none except the palaceous ones enclosing the marginal flowers ....40. Ancistrocarphus.
Leaves opposite; receptacle globose or ovoid...41. Psilocarphus.
Bracts open, subtending the achenes, persistent....42. Evax.
Bracts of 2 kinds, the lower completely enclosing their achenes, the others chaff-like surrounding a central cluster of flowers....43. Filago.

36. PLUCHEA. Marsh Fleabane.

Erect herb, branching above, with large oblong-lanceolate to ovate dentate leaves; involucral bracts ovate or lanceolate, acute, purplish; pappus alike in both kinds of flowers, soft, not thickened at the tips; flowers dull purple.

1. **P. camphorata** DC. In moist alkaline soil throughout our region; especially common in salt-marshes near the coast.

37. BERTHELOTIA. Arrow-wood.

Tall shrub with slender, erect, wand-like branches; leaves alternate, sericeous, linear-lanceolate, entire; involucre campanulate, the outer bracts obtuse and tomentose, the inner linear and deciduous; pappus of sterile flowers of rigid bristles with thickened tips; flowers pinkish.

1. **B. sericea** Rydb. Rather common along streams.

38. MICROPUS.

Slender erect floccose-woolly annuals with entire leaves and clustered several-flowered heads; involucre of a few open scarious bracts surrounding the flower-bearing bracts of the receptacle; pistillate flowers in 1 or 2 series on a small receptacle, each enclosed in a conduplicate bract which has a scarious appendiculate tip; perfect flowers in the center sterile and mostly naked; achenes gibbous, the corolla and style borne laterally, each enclosed in its bract and falling with it; pappus commonly none.

1. **M. californicus** F. & M. Frequent on plains and in the foothills and mountains up to about 1,500 m. from southern San Diego Co. to Oregon. Not reported from east of the San Jacinto and San Bernardino Mts.

39. STYLOCLINE.

Low, diffuse white-woolly annuals with alternate leaves and small, ovoid or nearly globular clustered heads; receptacle column-like or almost filiform bearing at its tip 4 or 5 sterile hermaphrodite flowers each subtended by a plane or somewhat concave bract; pistillate flowers marginal, each completely enfolded by the medial or basal portion of its very woolly bract; pappus none in the fertile flowers, sometimes of a few caducous bristles in the sterile ones.

Pistillate flowers enclosed in the central portion of wholly hyaline bracts, the margins of which are wing-like.................... 1. *S. gnaphalioides.*

Pistillate flowers enfolded by the entire basal portion of the bracts, the margins not wing-like. 2. *S. micropoides.*

1. **S. gnaphalioides** Nutt. On the plains and in dry creek-beds; from San Diego to middle California and the borders of the deserts.

2. **S. micropoides** Gray. Moist sand-washes of the Lower Sonoran Zone; Palm Springs, *Parish;* Palo Verde Valley, near the Colorado River, *Hall.*

40. ANCISTROCARPHUS.

Floccose annuals, branched at the base, with alternate leaves and discoid heads; involucral bracts boat-shaped, firm, with a hyaline tip and each enclosing a marginal flower; central flowers subtended by 5 open, coriaceous-herbaceous, ovate-lanceolate, persistent paleae, ending in incurved hooked spines; marginal flowers 5-9, pistillate and fertile, with filiform corollas; achenes obovate-fusiform; pappus none.

1. **A. filagineus** Gray. Mohave Desert, Caliente, Kern Co., *Brandegee;* Paso Robles, San Luis Obispo Co., *Barber.*

41. PSILOCARPHUS.

Depressed or prostrate floccose annuals with mostly opposite leaves and small heads solitary in the axils or at the ends of the branches; involucres globose with few bracts; receptacle globular or oval, chaffy; bractlets subtending the pistillate flowers cucullate-saccate, semi-obovate or semi-obcordate, rounded at the tip, the apex introrse, beaked with a hyaline inflexed or erect hyaline scale; central hermaphrodite sterile flowers few, with tubular 5-toothed corollas; achenes loose within the bract, oblong or narrow, straight, slightly compressed; pappus none.

Herbage loosely lanate; heads not numerous......... 1. *P. globiferus.*
Herbage canescent with appressed wool; heads numerous .... 2. *P. tenellus.*

1. **P. globiferus** Nutt. On the plains and hills, especially in exsiccated places.

2. **P. tenellus** Nutt. Glendale; Catalina Island; Santa Maria, Santa Barbara Co., *Eastwood;* not uncommon in the foothills of the Santa Monica Range; north to Washington.

42. EVAX.

Slender woolly annual, much branched from the base, with narrow alternate leaves and small, densely woolly heads clustered at the ends of the branches; involucral bracts thin, loose, deciduous at maturity from the convex receptacle; achenes obcompressed, smooth or nearly so; pappus none.

Leaves narrowed to a slender petiole; receptacle columnar .... 1. *E. sparsiflora.*
Leaves closely sessile; receptacle nearly flat......... 2. *E. multicaulis.*

1. **E. sparsiflora** Jepson. San Diego, *Cleveland;* San Luis Obispo, *Brewer;* middle California.

2. **E. multicaulis** DC. Mohave Desert, *Lemmon;* east to Arizona.

43. FILAGO.

Slender floccose-woolly annuals with alternate entire leaves and more or less glomerate small heads; involucral bracts few and scarious; receptacle convex or conic, chaffy, each bract subtending an achene; marginal flowers pistillate with filiform corollas and without pappus; middle flowers surrounded by a series of open paleae, a few of the central ones hermaphrodite, the others pistillate, often fertile and with a pappus of capillary bristles; achenes terete or nearly so, smooth or minutely glandular.

Plant erect; bracts of the inflorescence scarcely longer than the heads................. 1. *F. californica.*
Plant depressed and spreading; bracts of the inflorescence, short, obtuse.................. 2. *F. depressa.*
Plant erect or spreading; bracts of the inflorescence linear, elongated, several times longer than the heads....................... 3. *F. arizonica.*

1. **F. californica** Nutt. In dry open places of the Cismontane area north throughout the State; ascending the mountains to 2,200 m.; Palm Springs; east to Utah.

2. **F. depressa** Gray. Palm Springs, the type locality; Mohave and Colorado Deserts, north to Inyo Co.

3. **F. arizonica** Gray. Mohave Desert, *Mrs. Brandegee;* Catalina Island, *Mrs. Trask;* Arizona.

44. ANTENNARIA.

Perennial white-woolly herbs with mostly basal, broad, entire leaves and corymbose or racemose heads; heads many-flowered, dioecious, the flowers all tubular; involucre dry, scarious, white or colored, imbricated; receptacle naked; achenes terete or flattish; pappus a single row of bristles, in the fertile flowers capillary, in the staminate ones clavellate-thickened at the tips.

Heads solitary, terminating short stems or sessile among the basal leaves; pappus-bristles of sterile flowers scarcely thickened at tip .... 1. *A. dimorpha.*
Heads in cymose clusters terminating short or elongated stems; pappus-bristles of sterile flowers with thick or dilated tips.
  Tips of involucral bracts green to pale brown; heads 4-7 .... 2. *A. media.*
  Tips of involucral bracts olive-green to blackish; heads 1-4 .... 3. *A. densa.*
  Tips of involucral bracts rose-pink or white.
    Leaves permanently hoary on both faces......... 4. *A. speciosa.*
    Leaves green above............................ 5. *A. marginata.*

1. **A. dimorpha** T. & G. Dry, stony slopes in the mountains. Bear Valley, *Parish;* San Antonio Mt.; Mt. Pinos, Ventura Co.; thence to British Columbia, etc.

2. **A. media** Greene. Summit of Mt. San Gorgonio, *Wright, Blasdale, Mrs. Wilder;* common in the High Sierras and Rocky Mts.

3. **A. densa** Greene. Summit of Mt. San Gorgonio, the type station.

4. **A. speciosa** E. Nelson. Bear Valley, the type station, *Parish;* Mt. San Gorgonio; Mt. San Jacinto.

5. **A. marginata** Greene. South Fork of Santa Ana River, *Mrs. Wilder;* otherwise unknown in California.

45. GNAPHALIUM.

Woolly herbs with narrow sessile entire commonly decurrent leaves and cymose or glomerate heads of white, yellowish or rose-tinted flowers; heads heterogamous, discoid; involucral bracts thin, scarious, imbricated in several series; pistillate flowers in several series, with filiform corollas; central flowers hermaphrodite-fertile, with 5-lobed corollas and entire obtuse styles; pappus a single series of capillary bristles; achenes terete or compressed.

Pappus-bristles united at base, deciduous in a ring; inflorescence spike-like; low herb........ 1. *G. purpureum.*

Pappus-bristles not united at base, falling separately.

Involucre imbedded in loose wool, the bracts brown except at the scarious tips; low branching annual .... 2. *G. palustre.*

Involucre woolly only at the base, its bracts scarious.

Herbage becoming green in age, somewhat glandular and heavy-scented.

Perennial, stems woody below................ 3. *G. bicolor.*

Annual or biennial; stems herbaceous.

Inflorescence cymose; involucre broad; bracts white .... 4. *G. californicum.*

Inflorescence paniculate; involucre narrow; bracts rose-color or white.............. 5. *G. ramosissimum.*

Herbage persistently white-woolly throughout, scarcely glandular.

Involucre bright white; heads in loose panicles.

Lower leaves spatulate or rounded at apex, bracts ovate or oblong, obtuse; plant odorless .... 6. *G. microcephalum*

Leaves all linear, acute, subdecurrent; bracts broadly ovate; whole plant very fragrant .... 7. *G. beneolens.*

Involucre greenish-yellow or rusty; heads in close glomerules .... 8. *G. chilense.*

1. **G. purpureum** L. In saline and alkaline soils. Lincoln Park; San Diego, *Cleveland;* Claremont, *Shaw;* Purple Cudweed.

2. **G. palustre** Nutt. Occasional along river bottoms and on the margins of ponds. Lowland Cudweed.

3. **G. bicolor** Bioletti. In the foothills and along the coast from Lower California to middle California.

4. **G. californicum** DC. Rather common on the dry plains and foothills. California Everlasting.

5. **G. ramosissimum** Nutt. Common on wooded slopes. Pink Everlasting.

6. **G. microcephalum** Nutt. Frequent in dry washes and in the Chaparral Zone. Small-headed Everlasting.

7. **G. beneolens** Davidson. Type collected at Crescenta, Los Angeles Co., Sept., 1917, by *F. E. Burlew;* Idylwild and Clear Creek, *Perkins.*

8. **G. chilense** Spreng. Common on the sand-dunes along the coast and frequent in the foothills and mountains. Cotton-batting Plant.

Var. *confertifolium* Greene, is a stout low form with linear leaves densely clothing the stem up to the mostly sessile dense cluster of heads. Near Los Angeles, *Braunton;* northward with the species.

IV. MADIEAE.

Ray achenes laterally compressed, completely subtended by the involucral bract.

Rays inconspicuous.

Disk-flowers several .... 46. Madia.

Disk-flowers 1-4 .... 48. Harpaecarpus.

Rays showy .... 47. Madaria.

Ray achenes somewhat obcompressed, partially enclosed by the involucral bract.

Ray achenes smooth.

Pappus none in either disk or ray; flowers yellow 49. Hemizonia.

Pappus present, at least in the disk, paleaceous; flowers white or pink.................. 50. Calycadenia.

Ray achenes tuberculate or rugose.

Receptacle bracted only between ray and disk.

Involucral bracts 5-8, with short erect rigid tips .... 51. Deinandra.

Involucral bracts 15 or more, with longer spreading soft tips.................... 52. Zonanthemis.

Receptacle chaffy throughout; leaves and bracts spinescent-tipped .... 53. Centromadia.

Ray achenes obcompressed or clavate, completely enclosed by their bracts.

Bracts 5; herbage canescent...................... 54. Lagophylla.

Bracts more than 5.

Rays showy, yellow or white.................. 55. Layia.

Rays inconspicuous; pappus becoming showy.... 56. Achyrachaena.

46. MADIA. Tarweed.

Glandular and viscid heavy-scented herbs with at least the upper leaves alternate, entire or toothed; heads axillary and terminal; involucre angled by the carinate bracts each completely enfolding its ray-achene, their tips herbaceous; receptacle flat or convex, its bracts in a single row between the ray and disk flowers and often united into a cup; ray-flowers yellow, short, 3-lobed, fertile; disk-flowers sterile; pappus none; achenes laterally compressed, smooth.

Plant stoutish, viscid-glandular; heads clustered; disk-achenes angular .... 1. *M. sativa.*
Plant more slender; heads scattered; disk-achenes flat 2. *M. dissitiflora.*

1. **M. sativa** Mol. Frequent on the plains and grassy hills from San Diego Co. to Oregon. July-September.

2. **M. dissitiflora** T. & G. Upper Sonoran from San Diego Co. to Oregon. May-July.

47. MADARIA.

Erect glandular-pilose or somewhat hispid annuals with lanceolate usually entire leaves and corymbosely panicled heads of showy yellow flowers; involucral bracts wholly enclosing the ray-achenes; receptacle convex, densely fimbrillate-hirsute with a circle of bracts between the ray- and disk-flowers; ray-flowers fertile, showy, their achenes laterally compressed, smooth, not incurved; disk-flowers sterile; pappus none.

1. **M. elegans** DC. At middle and lower altitudes in the mountains from San Diego Co. to Oregon. June-September.

Var. *hispida* Hall. More slender and but slightly glandular, with long almost hispid spreading hairs; lower leaves opposite; rays clear yellow. Upper Sonoran from Tehachepi along both the Coast Ranges and Sierra Nevada Mts. to middle California.

48. HARPAECARPUS.

Low, slender viscid-glandular sweet-scented annuals with entire narrow mostly linear leaves, and numerous pedicellate small few-flowered heads; ray-flowers fertile, 4-8, minute; disk-flowers 1-4; bracts of the receptacle united to form a cup which encloses the disk-flowers, the receptacle otherwise naked; achenes slender, compressed or obcompressed; pappus none.

Disk-flowers 1; ray-achenes obovate-lunulate, laterally compressed .... 1. *H. exiguus.*
Disk flowers 1-4; ray-achenes broadly obcompressed... 2 *H. minimus.*

1. **H. exiguus** Gray. Frequent on wooded hillsides in open places. May-August.

2. **H. minimus** Greene. Strawberry Valley; Antelope Valley; Mt. Wilson.

49. HEMIZONIA.

Slender erect annuals with entire or denticulate leaves and small heads (in ours) yellow flowers; herbage hirsute and glandular; involucral bracts half enfolding the ray-achenes; ray-flowers 5-13, commonly 8, 3-cleft, 4-8 mm. long; ray-achenes with broad back and acute inner edge, broad at summit and pointed at base, nearly black; pappus none.

1. **H. Wheeleri** Gray. San Jacinto Mt.; San Bernardino Mts., and in the arid Transition Zone to the southern Sierras.

50. CALYCADENIA.

Rigid, strict virgate more or less hispid annuals with linear entire revolute leaves, the lowest opposite the upper alternate and glandular-tipped; receptacle small, flat, the herbaceous paleae only encircling the disk-flowers; ray-flowers 1-5, white or yellow, vespertine, palmately 3-lobed or -parted; ray-achenes obovoid-triangular, the terminal areola low, nearly central; disk-achenes turbinate-quadrangular, the outer fertile; pappus chaffy.

1. **C. tenella** (Nutt.) T. & G. Dry plains and sand-washes from Los Angeles to San Bernardino, Temecula and San Diego.

51. DEINANDRA.

Erect, rigid and brittle balsamic-viscid annuals with mostly small, few-flowered panicled heads and entire or serrate leaves; involucral bracts few, half enclosing their achenes, the tips short, rigid and erect; rays usually 5, broad, 3-toothed, diurnal; receptacle chaffy only next the rays; ray-achenes gibbous, tuberculate-rugose, the terminal areola raised upon a distinct curved beak from the angle of the ventral face of the achene; disk-achenes mostly sterile, with or without a paleaceous pappus.

Receptacle with a cup-like circle of bracts between disk and ray.

Rays 8-20; disk-flowers as many or more; disk-achenes well formed and with pappus of oblong obtuse pubescent or erose paleae.

Beaks of ray-achenes curved; some of the cauline leaves pinnatifid .... 1. *D. paniculata.*

Beak of ray-achenes straight; cauline leaves all entire .... 2. *D. floribunda.*

Rays mostly 5 (3-8); disk-flowers not more than 10.

Involucral bracts carinate; heads mostly in small clusters .... 3. *D. fasciculata.*

Involucral bracts not carinate; heads on slender peduncles.

Pappus of disk-flowers not united............ 4. *D. Wrightii.*

Pappus of disk-flowers united to near the summit .... 5. *D. Kelloggii.*

Receptacle with chaffy bracts throughout.

Rays 4 or 5; leaves crowded on the branchlets... 6. *D. virgata.*

Rays 5 to 8; leaves scattered on the branchlets.... 7. *D. Heermanni.*

1. **D. paniculata** (Gray). Plains of the upper Sonoran Zone. Common in places from Santa Barbara to San Diego; Santa Rosa Island.

2. **D. floribunda** (Gray). Southern part of San Diego Co.

3. **D. fasciculata** Greene. Very common and general on the plains and lower hills, except on the desert.

Var. *ramosissima* (Benth.) More diffuse; heads less fascicled or all scattered. Same range as the species, but less common.

4. **D. Wrightii** Greene. San Bernardino; Riverside; Antelope Valley.

5. **D. Kelloggii** Greene. Rare in Southern California. Collected near Pasadena, *Grinnell.*

6. **D. virgata** Greene. Dry hills near the coast of San Diego Co., *Parish;* Poway, *Cleveland.*

7. **D. Heermanni** Greene. Ojai, Ventura Co., *Hubby;* Tehachepi Pass, *Parry.*

52. ZONANTHEMIS.

Much branched annuals or perennials (?), soft-pubescent and viscid-glandular, with pinnatifid or serrate foliage and rather showy heads of yellow flowers; involucral bracts with long, soft tips; receptacle chaffy only next the ray-flowers; rays numerous (8-25), narrow, diurnal; ray-achenes obcompressed, somewhat rugose, stipitate, beaked; pappus of subulate-linear, unequal paleae or none. (*Hemizonia* in part).

Annual; disk-achenes all sterile, with pappus of minute scales or none.................. 1. *Z. corymbosa.*

Perennial (?); pappus of disk-achenes of about 10 subulate-linear unequal paleae.......... 2. *Z. clementina.*

1. **Z. corymbosa** Greene. Gaviota, Santa Barbara Co., and northward along the coast.

2. **Z. clementina** (Brandegee). Catalina, San Clemente, San Nicholas and Santa Barbara Islands.

53. CENTROMADIA.

Rigid corymbosely or diffusely branching annuals, with alternate pinnatifid or entire spinescent foliage and involucral bracts; herbage more or less resiniferous or glandular throughout; involucral bracts subulate, pungent, half enclosing the ray-achenes, persistent; ray-flowers 15-40, yellow, small, fertile; disk-flowers sterile; receptacle convex, chaffy throughout, the chaff distinct, persistent; ray-achenes triangular, the inner angle terminated by a short apiculation, nearly smooth or faintly rugose-tuberculate, without pappus; disk-achenes with or without a paleaceous pappus. (*Hemizonia* in part.)

Herbage yellowish-green, scentless or sweet scented..
  Disk- achenes without pappus.................... 1. *C. pungens.*
  Disk-achenes with 3 or more slender linear paleae. 2. *C. Parryi.*
Herbage dull and dark, ill-scented; disk-achenes with pappus .... 3. *C. Fitchii.*

1. **C. pungens** Greene. Common on the plains in heavy, rather moist soil.

2. **C. Parryi** Greene. Subsaline flats toward the coast.

3. **C. Fitchii** Greene. In a wheat field on the Mohave River, *Parish.*

54. LAGOPHYLLA.

Slender herbs with alternate entire leaves and small heads in leafy-bracted clusters; bracts of the involucre about 5, thin-herbaceous, flat on the back, with margins at base infolded and completely enclosing their achenes and deciduous with them; rays cuneate, palmately 3-cleft, their achenes obovate-oblong, smooth, nearly straight, pointless; receptacle flat, with a single row of paleae surrounding about 5 disk-flowers; pappus none.

1. **L. ramosissima** Nutt. Frequent in open places in the foothills and in the chaparral zone of the mountains.

55. LAYIA.

Spring annuals with mostly alternate leaves and showy heads terminating the branches; bracts of the involucre flattened on the back below, the dilated thin margins enfolding the ray achenes; rays 8 to 20, their achenes obcompressed, glabrous, without pappus; disk-flowers with cylindraceous, funnelform corollas, their lobes hirsute or villous; disk-achenes usually pubescent, mostly sterile, with a pappus of bristles or awns; receptacle flat, with a row of chaffy bracts between the ray and disk flowers.

Pappus-bristles long-plumose or villous below.
  Rays white or rose-color, surpassing the disk...... 1. *L. glandulosa.*
  Rays yellow or cream-color (sometimes edged with white).
    Inner hairs of pappus-bristles woolly and interlaced .... 2. *L. elegans.*
    Hairs of pappus-bristles all straight.
      Rays inconspicuous; leaves usually laciniate-dentate .... 3. *L. hieracioides.*
      Rays showy; leaves all entire (rarely dentate). 4. *L. graveolens.*
Pappus of scabrous aristiform bristles or wanting.... 5. *L. platyglossa.*

1. **L. glandulosa** H. & A. Common on the foothills of the Upper Sonoran throughout our region, barely extending to the desert area.

Var. *heterotricha* Hall. Rays 8-18, white; hairs of the pappus-bristles all straight and erect. Very common in the Upper Sonoran and Transition Zones of Mt. Pinos, Ventura Co., *Hall;* north to Inyo and Mendocino counties.

2. **L. elegans** T. & G. Common on the plains and foothills from Lower California to San Bernardino and Santa Barbara.

3. **L. hieracioides** H. & A. Santa Barbara, *Brandegee.*

4. **L. graveolens** Greene. Tehachepi; Mt. Pinos, *Hall.*

5. **L. platyglossa** Gray. Common throughout western California.

56. ACHYRACHAENA.

Soft-pubescent sparingly branched annual with narrow leaves, the lower opposite, and rather large heads terminating peduncuiliform branches; involucre oblong-campanulate, its bracts lanceolate, each enfolding a ray-achene; bracts of the receptacle membranous, in a single series between ray and disk; ray-flowers 5 to 10, little exceeding the disk, the ligules short and broad,. palmately 3-cleft; ray-achenes fertile, linear-clavate, all the ribs or the alternate scabrous; disk-achenes with a pappus of about 10 silvery-scarious paleae, the outer as long as the achene, the inner nearly twice as long.

1. **A. mollis** Schauer. In open grassy places in the coastal valleys; south to San Diego.

V. HELIANTHEAE.

Disk flowers sterile; involucre many-flowered; rays white; leaves entire ....57. Melampodium.

Disk flowers fertile.

  Pappus of several hyaline paleae; rays white, inconspicuous; heads very small; leaves opposite ....58. Galinsoga.

  Pappus never of hyaline paleae.

    Achenes obcompressed; involucre of 2 distinct series; rays yellow or none; bracts of involucre distinct.

      Achenes not awned; pappus obscure or none; rays neutral ....66. Coreopsis.

      Achenes with retrorsely barbed awns; rays sterile ....67. Bidens.

    Achenes, at least of the disk-flowers, never obcompressed; involucre various.

      Rays white; stems prostrate, spreading; bracts of the receptacle reduced to awn-like bristles subtending the naked achenes..68. Eclipta.

- Rays yellow or brown; stems erect; bracts of the receptacle concave, loosely subtending the disk achenes; receptacle flat to convex.
  - Disk achenes not winged, margined nor sharp-edged; pappus sometimes deciduous or none.
    - Rays fertile.
      - Pappus of conspicuous awns............60. Wyethia.
      - Pappus none ....59. Balsamorhiza.
    - Rays sterile (or none); pappus of 2 awns or paleae.
      - Achenes pubescent; pappus persistent or deciduous ....61. Viguiera.
      - Achenes glabrous; pappus deciduous....62. Helianthus.
  - Disk achenes flat, compressed, the 2 acute angles either ciliate or winged; pappus persistent.
    - Achenes not winged but strongly ciliate; rays neutral.
      - Perennials; style-branches bluntish, not villous; achenes without crown, usually epappose ....63. Encelia.
      - Annuals or biennials; style-branches longer, villous; achenes narrowly cuneate, strongly white margined, with awns and crown.............64. Geraea.
    - Achenes broadly winged; rays fertile......65. Verbesina.

57. MELAMPODIUM.

Herbaceous plants with ample opposite leaves and medium-sized heads in leafy-bracted cymes or panicles; outer involucre of several loose, often foliaceous bracts, the inner of smaller bracts each completely enclosing a marginal achene and deciduous with it; rays yellow or white; disk-flowers yellow, sterile; pappus none.

1. **M. perfoliatum** HBK. Occasional near Los Angeles. Introduced from Mexico.

58. GALINSOGA.

Slender, loosely branched, erect or ascending annual with thin, opposite, petiolate, lanceolate to ovate, serrate leaves and small slender-pedunculate heads of yellow flowers with 4-5 barely exserted white rays; involucre campanulate, of ovate, thin, nearly equal bracts in 2 series; achenes turbinate, 4- or 5-angled; pappus of 8-16 short paleae.

1. **G. parviflora** Cav. Waste places in the vicinity of Los Angeles; Huntington Park. Increasingly common in sandy soil.

59. BALSAMORHIZA. Balsam Root.

Low perennials with thick roots crowned by a tuft of radical leaves and several naked of few-leaved stems bearing one to several heads of yellow flowers; bracts of the broad involucre either nearly equal or the outer foliaceous; ray-flowers pistillate with conspicuous ligules; disk-achenes quadrangular; pappus none.

1. **B. deltoidea** Nutt. Upper Sonoran Zone. Mono Creek, Santa Barbara Co., *Hall;* near Manzana, Antelope Valley, summit of Tejon Pass; north to British Columbia.

60 WYETHIA. Mule-ears.

Coarse perennial herbs with mostly simple stems, alternate, usually entire leaves and large heads of yellow flowers; involucre campanulate or hemispheric, the bracts loosely imbricated in 2 or 3 series, foliaceous; receptacle flat or nearly so, the chaff rigid lanceolate, equalling and embracing the flowers; rays large, pistillate; achenes 4- or 5-angled, with a coroniform pappus of unequal scales, or with rigid awns at the angles.

1. **W. ovata** T. & G. In dry clayey soils at 750 to 1,400 m. Palomar and San Jacinto Mts.; San Gabriel Mts., *F. Grinnell Jr.*

61. VIGUIERA.

Shrubby perennials with slender, brittle stems and hispidulous-scabrous petioled chiefly opposite leaves; heads medium sized on long terminal peduncles; rays yellow, showy, sterile; involucral bracts much imbricated, herbaceous; chaff persistent and embracing the quadrangular-compressed pubescent achenes; pappus of 2 awns of paleae, one at each of the principal angles.

Leaves lanceolate; involucre green; achenes sparsely pubescent .... 1. *V. laciniata.*
Leaves ovate; involucre cinereous; achenes densely villous .... 2. *V. deltoidea.*
Leaves lanceolate to linear-oblong; involucre herbaceous, loose, more or less reflexed at apex; achenes glabrous; pappus none........ 3. *V. multiflora.*

1. **V. laciniata** Gray. Southwestern San Diego Co. and Lower California.

2. **V. deltoidea** Parishii Rose. Western San Diego Co.; Colorado Desert; Providence Mts., Mohave Desert, *Brandegee;* Lower California.

3. **V. multiflora** Blake. Los Angeles; near Santa Monica, *Hasse.*

62. HELIANTHUS. Sunflower.

Coarse annual or perennial herbs with simple or branched stems alternate or opposite leaves, and often very large heads; involucre flat to hemispheric, the thick bracts in several series; receptacle flat or convex, chaffy; rays mostly large and showy, neutral; disk flowers perfect, the corollas brownish, purple or yellowish; achenes flattened or slightly quadrangular, the pappus of two awns or scales early deciduous.

Annual; receptacle flat or nearly so.
  Involucral bracts ovate, abruptly attenuate........ 1. *H. annuus.*
  Involucral bracts lanceolate, gradually attenuate.
    Foliage green, mountain species................ 2. *H. petiolaris.*
    Foliage white with a strigose pubescence; desert species .... 3. *H. tephrodes.*
Perennial; receptacle convex to low conical.
  Outer pappus exceeding the disk, lanceolate or linear-subulate.
    Pappus-paleae slender-subulate.................. 4. *H. Parishii.*
    Pappus-paleae broadly lanceolate................ 5. *H. californicus.*
  Outer bracts not exceeding the disk, ovate, acute.. 6. *H. gracilentus.*

1. **H. annuus** L. A common weed in all our valleys.

2. **H. petiolaris** Nutt. Fredalba Park, San Bernardino Mts., *Miss Nora Pettibone.*

3. **H. tephrodes** Gray. Lower Sonoran Zone of the Colorado Desert southward; rare.

4. **H. Parishii** Gray. In wet places; near San Bernardino; low ground near Los Angeles; Cienega.

5. **H. californicus** DC. National Ranch, San Diego; Tehachepi, *Mrs. Brandegee.*

6. **H. gracilentus** Gray. In dry, gravelly or rocky soil on hillsides and in canyon bottoms from Mt. Gleason and Newhall to Ramona, San Diego Co.; near Claremont, *Baker;* Santa Susanna Pass.

63. ENCELIA.

Herbs or low shrubs with alternate or opposite 3-nerved entire or remotely toothed leaves and large pedunculate heads of showy flowers; rays yellow, neutral; disk-flowers yellow or brownish, perfect; receptacle flat, convex or conic, chaffy; achenes flattened, thin-edged, often villous; pappus none, or of 1 or 2 slender awns.

Heads paniculate, numerous; peduncles glabrous; involucre sparsely pubescent, 5-8 mm. high; rays 10-15 mm. long; disk yellow, the corolla-lobes glabrous; leaves white-tomentose .... 1. *E. farinosa.*

Heads solitary, terminating long simple branchlets; peduncles pubescent.

Involucre densely white-villous, 10-15 mm. high; rays 15-30 mm. long; disk purple, the corolla-lobes pubescent or glabrous; leaves green .... 2. *E. californica.*

Involucre canescent, 5-10 mm. high; rays 10-15 mm. long or none; disk yellow, the corolla-lobes pubescent; leaves green to white-tomentose .... 3. *E. frutescens.*

1. **E. farinosa** Gray. San Bernardino Valley, south to western San Diego Co. and Lower California, east to Arizona and north to Death Valley; Colorado Desert; somewhat rare on the Mohave Desert.

2. **E. californica** Nutt. Common in the lower portion of the chaparral zone.

3. **E. frutescens** Gray. From San Jacinto, Riverside Co., and the Greenhorn Mts., Kern Co., to Arízona and Utah.

Var. *actoni* Blake. Leaves ovate, large, whitened by a soft pubescence; heads large, radiate; outer bracts ovate-acuminate. Acton, Los Angeles Co., the type locality, *Elmer;* Antelope Valley, *Davy;* from Riverside Co. to Inyo Co., and east to Utah, various collectors.

64. GERAEA.

Annual or biennial glandular-pubescent simple or branched herbs with alternate dentate leaves and usually few paniculate radiate or discoid heads of yellow flowers; involucre hemispheric, the bracts linear or broadly oblong, in 2 or 3 series, equalling or shorter than the disk; receptacle flattish, the chaff softly scarious, conduplicate, deciduous with the achene; rays when present cuneate, the tube hairy; disk-corollas with cylindric tube and broader throat, limb hairy, 5-toothed; disk-achenes strongly compressed, villous on the edges, narrowly cuneate; pappus of 2 strong awns and a conspicuous crown.

Heads radiate; involucral bracts linear, densely ciliate; lower leaves narrowed to a petiolar base .... 1. *G. canescens.*

Heads discoid; involucral bracts oblong, densely glandular; leaves all sessile by a clasping base .... 2. *G. viscida.*

1. **G. canescens** T. & G. Sandy soil of the Lower Sonoran Zone on the Colorado and Mohave Deserts; eastward into Arizona and Nevada. *Desert Sunflower.*

2. **G. viscida** Blake. Campo, San Diego Co., several collectors; southward into Lower California.

65. VERBESINA.

Annual or perennial herbs with simple dentate or entire leaves and rather large pedunculate heads of yellow flowers; involucral bracts ovate to linear, imbricated in 2 or more series; receptacle convex to conic, the chaff embracing the disk-achenes; achenes laterally compressed, oblong or obovate, marginally winged; pappus of two awns, sometimes with 2 or 3 intermediate scales.

Leaves sessile, green on both sides.................. 1. *V. dissita.*
Leaves petioled, canescent at least beneath.
  Disk-achenes broadly winged, pubescent.......... 2. *V. encelioides.*
  Disk-achenes narrowly winged, glabrate........... 3. *V. australis.*

1. **V. dissita** Gray. Mill Creek Canyon, San Bernardino Mts., *Robertson;* near Arch Beach, Orange Co., *Mrs. M. F. Bradshaw;* southward to Lower California.

2. **V. encelioides** Gray. Los Angeles; San Fernando Valley; eastward to Colorado and Mexico.

3. **V. australis** Baker. Oxnard, Ventura Co., 1901, *Davy.*

66. COREOPSIS.

Glabrous annual or perennial herbs (rarely shrubby) with dissected leaves and medium-sized or large long-peduncled heads, solitary or in loose cymes; involucral bracts in 2 series, the outer of narrow foliaceous spreading bracts, the inner of broad membranous erect ones; rays broad, pistillate and often fertile, sometimes neutral; achenes linear-oblong to oval, flat or concavo-convex, the margins smooth, ciliate or winged; pappus of bristles, scales or teeth at the angles of the achene, or none.

Annual; disk-achenes thickened and corky-winged or conspicuously ciliate.
  Pappus none; disk-achenes corky-winged.......... 1. *C. Douglasii.*
  Pappus of 2 linear awns; mature disk-achenes long-ciliate.
    Outer involucral bracts linear.................. 2. *C. Bigelovii.*
    Outer involucral bracts broadly ovate........... 3. *C. calliopsidea.*
Perennial; achenes glabrous, flat, narrowly winged.
  Peduncles scattered, 1.5 dm. or more long; rays 3 cm. long .... 4. *C. maritima.*
  Peduncles corymbosely clustered, mostly less than 1.5 dm. long; rays 2.5 to 3 cm. long.... 5. *C. gigantea.*

1. **C. Douglasii** Hall. Common on dry plains and in open places in the lower parts of the chaparral zone.

2. **C. Bigelovii** Hall. Ventura and Santa Barbara Co's.; Mohave and Colorado Deserts; northward to Kern and Inyo Co's.

3. **C. calliopsidea** Gray. Mohave Desert, north to middle California.

4. **C. maritima** Hook. Coast of San Diego Co. to northern Lower California, and on the adjacent islands.

5. **C. gigantea** Hall. Near the coast from Los Angeles Co. to San Luis Obispo Co. and on the Channel Islands.

67. BIDENS.

Herbaceous plants with opposite simple or compound leaves and many-flowered solitary, racemose or panicled heads of yellow or brownish flowers; involucral bracts in 2 series, the outer often foliaceous, the inner membranous; receptacle flat, chaffy, the chaff flat or concave; rays when present neutral, yellow; disk-achenes flat, quadrangular or terete; pappus of 2-6 teeth or subulate awns, barbed or hispid.

Leaves simple; rays showy, yellow.................. 1. *B. expansa.*
Leaves compound; rays none or inconspicuous.
  Achenes flat; pappus of 2 retrorsely barbed awns... 2. *B. frondosa.*
  Achenes linear, tetragonal; pappus of 2-4 retrorsely barbed awns .... 3. *B. pilosa.*

1. **B. expansa** Greene. Common in shallow streams from San Bernardino to the neighborhood of Los Angeles; Ballona Marshes.

2. **B. frondosa** L. Los Angeles River; streets of Los Angeles.

3. **B. pilosa** L. Frequent along streets and irrigating ditches. Native of the American tropics.

68. ECLIPTA.

Annual with procumbent or ascending stems and opposite, lanceolate or oblong sparingly serrate leaves; heads small, solitary, white-flowered; rays short; disk-flowers perfect; involucral bracts 10-12 in 2 series, ovate-lanceolate, foliaceous; receptacle flat; achenes short, 3-4-angled, roughened on the sides, hairy at the summit; pappus an obscure crown or none.

1. **E. alba** Hassk. Near Imperial, *Hall;* Laguna Ranch, near Los Angeles, *Theodore Minthorn.*

VI. HELENIEAE.

A.—Leaves all opposite: flowers radiate, yellow.
Bracts of the involucre unequal, broad; pappus none; succulent perennial..........69. Coinogyne.

Bracts of the involucre equal.
  Involucre cup-like, its bracts united..........75. Lasthenia.
  Involucre of distinct ovate or oblong bracts....74. Baeria.

B.—Leaves alternate, at least above.

- Pappus present.
  - Heads discoid, or the rays very inconspicuous.
    - Leaves entire, or at least the upper.
      - Flowers yellow.
        - Herbage gummy; pappus of 8-12 obtuse paleae .... 85. Amblyopappus.
        - Herbage not gummy; pappus-paleae 5 or fewer, subulate awned.............. 86. Rigiopappus.
      - Flowers not yellow; herbage rough-pubescent; pappus of 4-8 paleae.......... 80. Palafoxia.
    - Leaves from dentate to pinnatifid or pinnately parted.
      - Herbage pubescent (mostly tomentose), at least when young.
        - Involucral bracts with colored hyaline margins.
          - Disk corollas with ovate to oblong lobes which are not twice as long as the campanulate or cylindro-campanulate throat .... 78. Hymenopappus.
          - Disk corollas deeply cleft into linear-oblong lobes at least three times as long as the funnel-form throat...... 79. Trichymenia.
        - Involucral bracts herbaceous.
          - Pappus of several paleae.
            - Stems 5 cm. or less high; involucre 3 mm. high.................. 82. Actinolepis.
            - Stems taller; involucre larger...... 87. Chaenactis.
          - Pappus apparently of slender tawny bristles; low desert annual.......... 89. Trichoptilium.
  - Heads radiate.
    - Rays white or purplish, never yellow.
      - Pappus an obscure crown and often 1 or 2 awns; rays white..................... 73. Perityle.
      - Pappus of lacerate paleae; rays purple, linear. *Hulsea heterochroma.*
    - Rays yellow; pappus paleaceous except in *Syntrichopappus.*
      - Herbage white-woolly, at least when young.
        - Pappus of numerous barbellulate bristles, united at the base................. 77. Syntrichopappus.
        - Pappus paleaceous, the paleae entire to fimbriate.
          - Rays persistent, becoming papery; desert perennial .... 71. Psilostrophe.
          - Rays deciduous, not becoming papery.
            - Involucral bracts in 1 series.
              - Anthers with obtuse or acute tips; tube of disk-corollas shorter than the throat; erect or ascending plants with peduncled heads; pappus-paleae, if present, not lacerate-fimbriate.

Achenes somewhat flattened; corolla tube glabrous, but a ring of hairs present at its junction with the throat; pappus none; outer bracts reduced ....81. PSEUDOBAHIA.
Achenes 4- or 5-angled, not flattened; corolla tube pubescent; pappus usually present: bracts all well developed....84. ERIOPHYLLUM.
Anthers with subulate tips; tube of the disk corollas equaling the throat ....83. ANTHEROPEAS.
Involucral bracts in 2 series........88. HULSEA.
Herbage glabrous or pubescent, but never woolly.
Involucral bracts erect, in 2 series......90. HYMENOXYS.
Involucral bracts closely reflexed........91. HELENIUM.
Pappus none.
Herbage not white-woolly.
Flowers yellow; rays present.
Leaves pinnately parted into linear lobes; low annual ....92. BLENNOSPERMA.
Leaves denticulate or entire; tall perennial.70. VENEGASIA.
Flowers white or purplish; rays wanting; leaves pinnately parted, *Chaenactis artemisaefolia.*
Herbage white-woolly, at least when young.
Ray corollas with a toothed appendage at orifice opposite the ligule...........76. MONOLOPIA.
Ray corollas without appendage.
Rays yellow, persistent, becoming papery...72. BAILEYA.
Rays yellow, deciduous..................84. ERIOPHYLLUM.
Rays purple or flesh-colored, deciduous, *Syntrichopappus Lemmoni.*

69. COINOGYNE.

Perennial glabrous herbs with linear, entire, opposite leaves connate in pairs at base; heads medium-sized, many-flowered, solitary, terminating the branches; flowers yellow, the rays pistillate, all fertile; involucre cylindraceous-campanulate, its bracts broad and imbricated, the outermost short; receptacle naked, conical; corolla glabrous; style branches of the disk-flowers thickened upward and papillose; achenes linear, striately 10-nerved; pappus none.

1. **C. carnosa** Less. (*Jaumea carnosa* A. Gray.) All along the California coast, and to British Columbia.

70. VENEGASIA.

Perennial herbs with tall, leafy stems, somewhat woody at base; leaves petioled, alternate, ovate, acuminate, crenate-dentate to subentire; heads large, terminal or in the upper axils, radiate; involucre of 2 or 3 series of broadly oval, membranaceous, erect bracts, the innermost narrower and more scarious than the outer; receptacle flat, naked; rays many, showy; corolla-tube densely glandular-bearded at base; achenes many-nerved; pappus none.

1. **V. carpesioides** DC. Coastal subarea from Santa Barbara nearly to San Diego Co., and to be expected further south.

71. PSILOSTROPHE.

Low, corymbosely branched, woolly, perennial herbs with alternate, spatulate to linear, often pinnatifid leaves and small heads of flowers with persistent yellow rays; involucre cylindric-campanulate, of 4 to 10 woolly bracts; achenes narrow, terete, obscurely striate or angled; pappus of 4 to 6 oblong or lanceolate, entire or erose, hyaline paleae.

1. **P. Cooperi** Greene. (*Riddelia Cooperi* Gray.) Mohave and Colorado Deserts, Arizona, Nevada, Utah and Lower California. Type locality, Fort Mohave.

72. BAILEYA.

Floccose annuals or perennials of the desert; leaves alternate, the lower pinnatifid, the upper entire; heads solitary, pedunculate; involucre hemispheric, of numerous woolly bracts; rays yellow and showy when young, becoming papery and reflexed in age; disk-flowers numerous, fertile, the corolla gradually expanding above the short proper tube, the teeth bearded; style-branches short, obtuse; achenes oblong or clavate, truncate at the apex, many-striate; pappus none.

Rays 5 to 8, roundish-oval; peduncles short...... 1. *B. pauciradiata.*
Rays 20 to 50, oblong, 3-toothed at apex.......... 2. *B. pleniradiata.*

1. **B. pauciradiata** Harv. & Gray. Mohave and Colorado Deserts, east into Arizona.

2. **B. pleniradiata** Harv. & Gray. Southern California, to New Mexico and Lower California.

73. PERITYLE.

Annual or biennial glabrous or viscid-pubescent herbs; leaves petioled, opposite or alternate; heads pedunculate, many-flowered, the disk-flowers yellow, the rays white or yellow; bracts of the involucre in a single series, more or less imbricated, faintly keeled and somewhat enclosing the marginal achene; achenes flat, cartilaginous-margined, usually ciliate; pappus a squamellate or cupulate crown with frequently a slender awn from one or both of the angles, the awn wanting in the var. *nuda* Gray.

1. **P. Emoryi** Torr. Southern California to Arizona and Lower California. Palm Springs; Catalina Island.

74. BAERIA.

Low, mostly slender annuals, usually pubescent, with opposite linear entire or laciniate-pinnatifid leaves and slender-pedunculate terminal heads of yellow flowers; rays showy, pistillate; involucre campanulate or hemispheric, of many narrow, somewhat carinate bracts; achenes linear or somewhat clavate; pappus of paleae, awns, or both, or none.

Involucre of only 3 or 4 bracts; ligules obsolete or wanting; pappus of attenuate paleae; leaves entire .... 1. *B. microglossa.*
Involucre of more numerous bracts.
  Leaves entire, not glandular-pubescent.
    Pappus none .... 2. *B. chrysostoma.*
    Pappus present .... 3. *B. gracilis.*
  Leaves toothed, dissected, or some entire, more or less glandular-pubescent.
    Leaves broadly linear to oblong; pappus either of two sorts or none..................... 4. *B. uliginosa.*
    Leaves or their divisions filiform or linear; pappus of lanceolate or oblong paleae, some or all of them tapering into awns without equalling the corolla................. 5. *B. aristata.*

1. **B. microglossa** Greene. Andreas Canyon, near Palm Springs, Colorado Desert. *Parish.* San Luis Obispo Co. to middle California, on low ground.

2. **B. chrysostoma** F. & M. Common in open places in the coast valleys and foothills.

3. **B. gracilis** Gray. Common throughout Southern California. Dr. Hall has separated a number of forms based on the variations in shape and pubescence of the achene.

4. **B. uliginosa** Gray. Found in low, wet places. Santa Barbara, acc. *Gray.*

5. **B. aristata** Hall. San Diego, Riverside, Port Ballona. The forma *mutica* Hall differs in having oblong paleae with erose summits and is found at San Diego, San Jacinto, Beaumont and Redondo. The var. *affinis* Hall is more slender than the typical form, with 6 to 8 ray-flowers; the pappus of 6 to 10 oblong or lanceolate paleae as long as the corolla-tube, with erose or laciniate margins, some of which are continued into awns equalling the corolla. It has been collected near Los Angeles, at North Pomona, Claremont. Cajon Pass and San Bernardino.

75. LASTHENIA.

Glabrous, succulent annuals, having opposite, mostly narrow and entire, sessile leaves; heads on slender terminal peduncles; involucre of a single series of bracts, connate into a 5-15 toothed cup; receptacle conical; ray-flowers yellow, about 8 mm. long; achenes narrowly obovate, with obtuse edges, covered with rough, yellow, gland-like points; pappus none.

1. **L. glabrata Coulteri** Gray. Common along borders of salt marshes and on inland alkali flats, San Diego to Santa Barbara and in the San Joaquin valley.

76. MONOLOPIA.

White-woolly annuals with alternate sessile leaves and large long-peduncled heads of yellow flowers; involucre hemispheric, its bracts distinct to near the base or connate into a cup with broad triangular teeth; receptacle conical, naked; ray-flowers 3- to 4-toothed, bearing at the base of the ligule a roundish denticulate appendage; disk-flowers having somewhat hairy lobes; achene obovoid, angular, black; pappus none.

1. **M. major** DC. On grassy slopes, especially on heavy soils.

77. SYNTRICHOPAPPUS.

Low, diffuse, white-woolly annuals, chiefly of the desert; leaves alternate, narrow, entire or lobed at the apex; heads small, short-peduncled, with yellow or purplish ray-flowers and yellow disk-flowers; involucre campanulate, of 5 to 8 narrow, scarious margined bracts which partly enfold the ray-achene; receptacle flat; style-tips flattened, acute; achenes linear-turbinate, pubescent; pappus of numerous bristles united at base or none.

Rays yellow; pappus of numerous barbellate bristles.. 1. *S. Fremonti.*
Rays rose or flesh-color with white margins; pappus none .... 2. *S. Lemmoni.*

1. **S. Fremonti** Gray. Cajon Pass to Mohave River; Mohave Desert; Tehachepi Pass; east to Utah and Arizona.

2. **S. Lemmoni** Gray. Manzana, Antelope Valley; Cajon Pass; San Bernardino Plains; Rock Creek.

78. HYMENOPAPPUS.

Ours perennial herbs with alternate or mostly basal pinnatifid leaves and corymbose or solitary pedunculate heads of yellow flowers; rays wanting; involucres campanulate, of 6 to 12 bracts with scarious and often colored margins; corollas with narrow tube, abruptly dilated throat, and spreading or recurved lobes; achenes obpyramidal, 4- or 5-angled; pappus of 10 to 20 thin, obtuse paleae.

Involucral bracts very unequal.................... 1. *H. lugens.*
Involucral bracts nearly equal.................... 2. *H. filifolius.*

1. **H. lugens** Greene. Mountains and foothills bordering the deserts; Bear Valley, San Bernardino Mts.; Coyote Canyon, Riverside Co.; Cuyamaca Mts.; Lower California.

2. **H. filifolius** Hook. Providence Mts., Mohave Desert; east to Nebraska.

79. TRICHYMENIA.

Perennial herbs with alternate, petioled biternately divided leaves, the divisions linear; heads discoid, corymbose-paniculate; involucre turbinate, its bracts in two series, the inner 6-8 obovate or oblong, scarious and tinged with purple, the outer more herbaceous; rays wanting; disk-flowers hermaphrodite; corollas pale-purplish or almost white; tube slender, glandular; limb cleft nearly to the tube into oblong-linear lobes, equal or in the marginal flowers somewhat unequal; anthers purple, wholly exserted, bidentate at the base and tipped with ovate appendages; achenes elongate, obconic, 4-angled, villous; pappus of 15 to 18 narrowly linear-lanceolate squamellae with strong midrib excurrent into short barbellate awns.

1. **T. Wrightii** Rydb. Pine Valley, San Diego Co.; Stonewall Mine, Cuyamaca Mt., San Diego Co.; southern Arizona and Lower California.

80. PALAFOXIA.

Ours a much branched annual or perennial herb of the desert area with alternate, linear, entire leaves and narrow, discoid heads; corollas all alike or the outer ones sometimes with very unequal lobes; involucre of linear nearly equal bracts which lightly clasp the outer achenes; achenes nearly as long as the bracts, the slender pappus therefore much exserted.

1. **P. linearis** Lag. Lower Sonoran Zone throughout the Colorado Desert; less common on the Mohave Desert; east into Arizona; south into Mexico.

81. PSEUDOBAHIA.

Ours sparingly floccose annuals with alternate, pinnatifid leaves and radiate heads; involucre campanulate, its bracts in one or two series, united at base, somewhat concave, those of the outer series represented by fleshy lobes or callosities at the sinuses of the involucre, or wanting; receptacle conic, acute;

ray-flowers about as many as the principal bracts, pistillate and fertile; ligules broad, yellow; disk-flowers many, hermaphrodite and fertile; corolla-tube slender, longer than the funnelform throat, villous at their junction; anther-tips ovate; style-tips truncate; achenes slightly angled, more or less compressed, oblanceolate in outline, rounded at the apex; pappus usually wanting.

1. **P. Heermannii** Rydb. Mohave Desert at Kramer, San Bernardino Co., *Mrs. Brandegee;* Sierra Nevada foothills of middle California.

82. ACTINOLEPIS.

Low villous-floccose annual herbs, diffusely branched from the base; leaves alternate, spatulate, 3-toothed or -lobed at the apex; heads radiate or discoid, sessile, leafy-bracted, in small clusters at the ends of the branches; involucre campanulate; bracts few, 5-7, elliptic, boat-shaped and partly enclosing the marginal achenes; receptacle flat; ray-flowers, if present, 3-7, pistillate and fertile; ligules yellow, obovate, short; disk-flowers several, hermaphrodite, fertile or sterile; corollas yellow, tube glandular or pubescent, shorter than the campanulate throat; lobes 5, ovate; anthers with ovate obtuse tips; achenes 4-5-angled, striate, narrow, gradually tapering toward the base; pappus of 5-12 membranous paleae, laciniate-cleft into short bristle-like divisions.

Rays present; paleae shorter than the corolla-tube...1. *A. multicaulis.*
Rays wanting; paleae fully equalling the corolla-tube..2. *A. Pringlei.*

1. **A. multicaulis** DC. Common in Southern California west of the mountains. Also in southern Arizona, acc. to Gray, and therefore to be expected in our desert area.

2. **A. Pringlei** Greene. In gravelly soil on the Mohave Desert and surrounding mountains, west to Mt. Pinos, Ventura Co., north to the Greenhorn Range, *Hall & Babcock,* and east into Arizona. Type locality, Mohave Desert.

83. ANTHEROPEAS.

Low floccose annual herbs, branched at the base, with alternate, spatulate to linear-spatulate, entire or 3-toothed leaves; heads radiate, short-peduncled, solitary at the ends of the branches; involucre campanulate, its bracts 5-9, elliptic, distinct or nearly so, concave and slightly enfolding the ray-achenes; receptacle strongly convex or low-conic, obtuse, naked; ray-flowers 5-9, pistillate and fertile; ligules yellow, white or tinged with rose or purple; disk-flowers about 20, hermaphrodite and fertile; corolla-tube glandular or pubescent, about equalling the campanulate throat; anthers with subulate tips; style-branches obtuse or with conic tips; achenes elongate, narrow, 5-angled, gradually tapering downward; pappus of 6-12 opaque paleae, either all elliptic and obtuse or those of the angles linear-lanceolate and produced into an awn-tip, or rarely wanting.

Pappus-paleae all obtuse, rarely wanting, shorter than the corolla-tube; leaves broadly spatulate or obovate; ligules yellow or reddish, rarely white; achenes glabrate or sparingly hairy.
  Ligules yellow, indistinctly toothed; leaves usually entire .... 1. *A. Wallacei.*
  Ligules reddish or rarely white, distinctly 3- or 4-toothed; leaves often 3-lobed at the apex. 2. *A. rubellum.*
Pappus-paleae on the angles narrow, linear-lanceolate or linear, produced into an awn, much longer than the rest; leaves linear or narrowly linear-oblanceolate; ligules white .... 3. *A. lanosum.*

1. **A. Wallacei** Rydb. In gravelly or sandy soil; San Bernardino Valley; San Jacinto Mts.; Pacoima Wash; east to Arizona and southern Utah.

2. **A. rubellum** Rydb. Western borders of the Colorado Desert at San Felipe, San Diego Co. (the type locality), *Parry.*

3. **A. lanosum** Rydb. A rare species, acc. to *Hall,* ranging from Lower California and along our eastern borders to southern Nevada.

84. ERIOPHYLLUM.

Annual or perennial herbs or low shrubs with alternate, entire or pinnately lobed or dissected leaves; heads radiate, rarely discoid, peduncled at the ends of the branches, solitary or corymbose or corymbose-paniculate; involucre hemispheric, its bracts in a single series or in two equal series, somewhat overlapping, concave or somewhat boat-shaped, disposed to envelop the outer achenes; receptacle flat or convex, naked, or rarely with a few paleae; rays pistillate and fertile; ligules yellow, oblong, usually toothed at the apex; disk-flowers hermaphrodite and fertile; corolla-tube densely glandular-hispid, its limb 5-lobed; achenes linear or linear-clavate, glabrous, hirsute or glandular; pappus of 4-12 hyaline, often erose paleae, or rarely wanting.

Annual; bracts in 1 series, oblong; heads campanulate, long-peduncled, conspicuously radiate.
  Rays 2-3 mm. long; bracts usually united.
    Bracts acute; leaves spatulate, toothed or lobed .... 1. *E. parviflorum.*

Bracts acuminate; leaves narrowly oblanceolate .... 2. *E. ambiguum.*

Rays 5-8 mm. long; leaves mostly entire, sparingly floccose; involucre 6-7 mm. high, its bracts usually distinct; pappus-paleae minute or wanting ...... 3. *E. paleaceum.*

Perennial (sometimes blooming the first year).

Heads comparative large on long peduncles, mostly solitary; achenes glabrous or nearly so.

Leaves obovate or broadly oblanceolate, entire or minutely several-toothed; pappus paleae narrowly lanceolate, about 1 mm. long .... 4. *E. obovatum.*

Leaves narrowly linear-oblanceolate, 1-2 cm. long; pappus-paleae minute.......... 5. *E. brachylepis.*

Heads small, corymbose and short-peduncled at the ends of the branches.

Rays 6-10; bracts 8-12, oblong, scarcely overlapping; achenes hispidulous on the angles.

Leaves white-tomentose on both sides, twice pinnatifid with many segments; achenes not glandular............ 6. *E. Nevinii.*

Leaves glabrate above, entire or rarely with a few short lobes; achenes glandular on the faces; inflorescence dense.... 7. *E. staechadifolium*

Rays 4-6; bracts a few, broadly oval, their edges strongly overlapping.

Heads 7-8 mm. high.................... 8. *E. tanacetifolium.*

Heads 5 mm. high or less.

Corymbs densely congested; heads nearly sessile; achenes glabrate or glandular on the faces.

Leaves pinnatifid, with linear divisions. 9. *E. confertiflorum.*

Leaves 3-fid (rarely 5-fid), with short divisions ....10. *E. trifidum.*

Corymbs more open; heads distinctly peduncled; achenes pubescent all over.

Leaves with ascending divisions or lobes.

Leaves pinnatifid, if ternate, the middle lobe the longer.

Leaf-segments lanceolate; involucre about 5 mm. high..............11. *E. cheiranthoides.*

Leaf-segments linear; involucre about 4 mm. high.............12. *E. tenuifolium.*

Leaves ternately or biternately cleft above into nearly equal divisions.

Leaf-segments linear, narrow, usually again ternately cleft; stem loosely floccose ....13. *E. biternatum.*

Leaf-segments short-lanceolate, entire or the middle one rarely ternate; stem densely tomentose...14. *E. tridactylum.*

1. **E. parviflorum** Rydb. Southern California. Type locality, Fort Tejon, Calif.

2. **E. ambiguum** A. Gray. Southern California. Type locality, near Fort Tejon, Calif. Palm Springs.

3. **E. paleaceum** Brand. Kern and Tulare to Riverside counties. Type locality, Kernville, Calif.

4. **E. obovatum** Greene. Mountains of Southern California. Type locality, San Bernardino Mountains.

5. **E. brachylepis** Rydberg. Type collected in Bear Valley, San Bernardino Mountains, by *Parish.*

6. **E. Nevinii** A. Gray. San Clemente and Santa Catalina Islands. Type locality, San Clemente Island.

7. **E. staechadifolium** Lag. Along the coast from Santa Barbara northward, acc. *Gray,* and the Channel Islands, acc. *Brandegee.*

8. **E. tanacetifolium** Greene. Riverside, *Koethen,* and San Bernardino, *S. B. & W. F. Parish.*

9. **E. confertiflorum** A. Gray. Common throughout Southern California, on dry hills.

10. **E. trifidum** Rydb. Monterey to Central Lower California; San Gabriel Mts.

11. **E. cheiranthoides** Rydb. Southern California. Type locality, Mission Hills, Santa Barbara, Calif.

12. **E. tenuifolium** (DC) Rydb. Central California to Lower California and Arizona. Rock Creek.

13. **E. biternatum** Rydb. Tulare and San Bernardino counties. Type locality, Kern River, Tulare Co., Calif.

14. **E. tridactylum** Rydb. Central and Southern California.

85. AMBLYOPAPPUS.

Low, glandular annual with alternate, linear, entire leaves, or the lower sometimes opposite and pinnately 3-5 parted; heads small, discoid, in loose cymes or racemes terminating the branches; bracts of the involucre 4-6, broad, more or less enclosing the marginal achenes; receptacle small, conical; achenes small, 4-angled, narrowed below; pappus of 8-12 oblong, obtuse paleae.

1. **A. pusillus** H. & A. Coast of Southern and Lower California; Redondo; Catalina Island.

86. RIGIOPAPPUS.

Slender annual with alternate linear leaves and small, solitary heads on filiform peduncles, terminating the branches; bracts of the involucre linear-subulate; receptacle flat, naked; flowers yellow, white or purple; pistillate flowers 5-15, their rays scarcely exceeding the disk; style-branches of the perfect disk-flowers with a slender-subulate hispidulous tips; achenes linear; pappus of 3-5 subulate awns, rarely wanting.

1. **R. leptocladus** Gray. Upper Sonoran Zone; Tehachepi, *Hasse & Davidson;* San Francisquito Canyon, *Hall & Chandler.*

87. CHAENACTIS.

Low annuals or perennials with alternate, pinnately dissected leaves and pedunculate heads of yellow or whitish flowers; receptacle flat, naked; involucre campanulate, its bracts herbaceous, linear to lanceolate, in one series; heads rayless but the marginal flowers frequently with a palmate limb simulating a ray; achenes slender, more or less pubescent; pappus of hyaline paleae, those of the outer flowers shorter and fewer, usually wanting in *C. artemisiaefolia.*

Pappus paleae persistent, entire or erose.
  Flowers yellow, annuals.
    Stem branching above, or also at the base; peduncles not scapelike.
      Involucral bracts narrowly oblong, their tips obtuse; marginal corollas mostly with enlarged limb.
        Pappus paleae of inner corollas nearly as long as the corolla, acute.
          Bracts glabrate in age.................. 1. *C. glabriuscula.*
          Bracts glandular-hispid .... 2. *C. denudata.*
        Pappus paleae much shorter than the corolla, obtuse.
          Paleae in two series, the outer minute... 3. *C. heterocarpha.*
          Paleae in one series, all short.......... 4. *C. gracilenta.*
      Involucral bracts linear, acute; marginal corollas regular.
        Leaf-lobes slender, elongated.
          Plant tall and mostly simple below; soon glabrate .... 5. *C. tenuifolia.*
          Plant branched at base and decidedly floccose .... 6. *C. aurea.*
        Leaf-lobes short, thick, obtuse; inflorescence glandular .... 7. *C. Orcuttiana.*
    Stem branching only near the base; peduncles elongated, the earlier ones scapelike; herbage woolly .... 8. *C. lanosa.*
  Flowers white or flesh-colored.
    Annual.
      Stamens exserted from the corolla-tube.
        Pappus of disk-flowers of 4 equal paleae, or these sometimes unequal.

Involucral bracts acuminate; receptacle usually bristly.
Heads broadly turbinate, often 1 cm. broad; paleae of the central flowers half as long as the corollas......... 9. *C. carphoclinia.*
Heads narrowly turbinate, 5-6 mm. board; paleae all very short.......10. *C. attenuata.*
Involucral bracts obtuse or merely acute.
Leaves bipinnatifid; involucres in age glandular-puberulent.
Segments linear or filiform; paleae of central flowers at least two-thirds as long as the corollas................11. *C. stevioides.*
Segments oblong or short-linear; paleae all very short...............12. *C. brachypappa.*
Leaves simply pinnate, with few linear divisions, or simple.
Marginal flowers much enlarged; paleae 4, rarely 5 or 6, equal or nearly so; plant rather simple, erect; leaves, or their segments, linear-filiform....13. *C. Fremontii.*
Marginal flowers scarcely enlarged; bracts with somewhat foliaceous tips; principal paleae 4 with 2-4 smaller outer ones.......................14. *C. Xanthiana.*
Stamens included; some of the outer bracts spreading above ....15. *C. macrantha.*
Perennial; corollas all alike; paleae 8-15, equal, linear, lanceolate or oblong.
Plant subscapose, with rosulate leaves and nearly naked peduncles; leaves linear in outline, bipinnatifid or pinnatifid with lobed divisions, densely white-woolly....16. *C. santolinoides.*
Plant suffrutescent; leaves pinnate with linear, usually entire divisions; leaf-segments short; involucre 12-13 mm. high; paleae 13-15 ....17. *C. Parishii.*
Pappus of deciduous fimbriate paleae or none; achenes flat, obovate or clavate; glandular-pubescent annual ....18. *C. artemisiaefolia.*

1. **C. glabriuscula** DC. Washington to Southern California. Common in sandy soil and gravelly ground in the lower hills and along the coast.

2. **C. denudata** Nutt. Southern California. Type locality, Los Angeles, Calif.

3. **C. heterocarpha** Gray. Sacramento Basin. San Bernardino County, *Hall.*

4. **C. gracilenta** Greene. Kern County to Riverside County. Griffith Park.

5. **C. tenuifolia** Nutt. Southern and Lower California. Type locality, San Diego, Calif.

6. **C. aurea** Greene. Southern California. Type locality, Mt. Wilson.

7. **C. Orcuttiana** Parish. Sea beaches, Southern and Lower California. Type locality, San Diego.

8. **C. lanosa** DC. Central to Lower California. Common in dry or sandy places, Upper and Lower Sonoran Zones, except in desert area.

9. **C. carphoclinia** Gray. New Mexico to Nevada, Southern and Lower California. Mohave Desert.

10. **C. attenuata** Gray. Arizona and Southern California. Colorado Desert, *Brandegee*.

11. **C. stevioides** H. & A. Lower Sonoran of the Mohave and Colorado Deserts.

12. **C. brachypappa** Gray. Southern Nevada and Southern California. Panamint Mts.; Northeastern Ventura County to Colorado Desert, *Hall*.

13. **C. Fremontii** Gray. Mohave Desert; Lower Sonoran of the Colorado Desert; Antelope Valley. Type locality, Mohave Desert.

14. **C. Xanthiana** Gray. Southern California and Arizona; rare in Antelope Valley. Type locality, Fort Tejon.

15. **C. macrantha** Eat. Utah, Nevada, Arizona and eastern California. Lower Sonoran of the Mohave Desert, *Hall*.

16. **C. santolinoides** Greene. Southern California, Transition Zone, dry, gravelly slopes. Type locality, San Bernardino Mts.

17. **C. Parishii** Gray. Southern California and northern Lower California. Type locality, Southern border of California.

18. **C. artemisiaefolia** Gray. Southern and Lower California. Upper Sonoran, away from the sea.

88. HULSEA.

Biennial or perennial montane herbs with alternate, sessile, scattered or mainly basal leaves and rather large solitary or paniculate heads; involucre hemispheric, its bracts narrow, acute, in 2 or 3 series, the outer somewhat shorter; receptacle flat; style-branches of hermaphrodite flowers obtuse; achenes linear-cuneate, compressed, soft-villous on the margins; pappus-paleae 4, broad, entire to lacerate.

Basal leaves spatulate or obovate to oblanceolate, woolly or floccose.
  Stem tall, 3-10 dm. high, leafy; plant biennial or annual.
    Rays 12-20 mm. long; leaves in age glabrate and green .... 1. *H. californica*.

Rays 5-8 mm. long; leaves permanently floccose. 2. *H. callicarpha.*
Stem low, less than 3 dm. high, leafy at base; plant perennial.
Leaves thick, entire or merely sinuately toothed, densely tomentose; stem branched, with several heads .... 3. *H. vestita.*
Leaves comparatively thin, more loosely floccose, coarsely lobed or toothed; stems scapiform, monocephalous .... 4. *H. Parryi.*
Leaves oval or elliptic or ovate, viscid-villous, saliently toothed; stem tall, leafy throughout; heads several; rays numerous, purple.... 5. *H. heterochroma.*

1. **H. californica** T. & G. Mountains of southern San Diego Co. and Lower California. Not common.

2. **H. callicarpha** Wats. Open hillsides and beneath pines in the Lower Transition Zone of the southern California mountains. Mt. Gleason, *Barber;* Idylwild; Santa Ana River, above Seven Oaks. Type locality, Thomas Valley, San Jacinto Mts.

3. **H. vestita** Gray. Transition Zone of Southern California mountains. Bear Valley Dam, San Bernardino Mts.

4. **H. Parryi** Gray. Canadian, Hudsonian and Alpine Zones of the San Bernardino Mts.; top of Mt. San Gorgonio, *F. Grinnell.*

5. **H. heterochroma** Gray. At middle altitudes of all our mountains. Mt. Wilson; Cucamonga Peak, *I. M. Johnston,* no. 1610; Sister Elsie Peak, *F. Grinnell, Jr.*

89. TRICHOPTILIUM.

Low spreading floccose annual with alternate leaves, or the lower opposite, and yellow, discoid, scattered heads on slender ascending peduncles; involucre hemispheric of about 20 nearly equal bracts in 2 series, the inner narrower and thinner, all flat; receptacle flat, naked; corolla with short tube and elongated throat, the lobes short and spreading; marginal corollas somewhat enlarged; style-branches linear, obtuse; achenes oblong-turbinate, villous; pappus paleae 5, lanceolate, dissected into slender fimbriae.

1. **T. incisum** Gray. Colorado Desert to Arizona and Lower California. Palm Springs.

90. HYMENOXYS.

Herbaceous perennials or annuals with gland-dotted alternate divided leaves and few or numerous showy pedunculate heads; involucre of 2 series of bracts, the outer ones thick, united at the base, the inner ones thinner and broader, often with fimbriate margins; ray flowers pistillate or the heads homogamous; rays pale to bright yellow; achenes turbinate, pubescent; pappus of 5-12 conspicuous hyaline pointed paleae.

Pappus-paleae very obtuse, erose at summit; perennial. 1. *H. Cooperi.*
Pappus-paleae acuminate or cuspidate.
  Involucre hemispheric, about 12 mm. broad; outer bracts 12 to 14; biennial............... 2. *H. biennis.*
  Involucre campanulate, 6-9 mm. broad; outer bracts 8-10; annual......................... 3. *H. excurrens.*

1. **H. Cooperi** Ckll. Southern California and Arizona. Type locality; Providence Mts., Mohave Desert.

2. **H. biennis** Hall. Providence Mts., Mohave Desert; Arizona to Utah.

3. **H. excurrens** Rydb. Western Arizona, southern California and Lower California; Paloverde Valley, Riverside Co.

91. HELENIUM. Sneezeweed.

Erect herbs, ours perennial, with resinous-dotted sessile (except the lower) alternate leaves, often decurrent on the stem; heads solitary or cymose, on long, naked peduncles; flowers yellow, or the lobes of the disk corollas turning yellowish or brownish, all perfect or the ray-flowers pistillate or neutral; rays several, usually drooping; bracts of the involucre linear, reflexed; receptacle globose or hemispheric, naked; achenes turbinate, ribbed; pappus of 5-12 thin or hyaline paleae, in ours short-pointed.

Rays shorter than the disk, 2-8 mm. long.
  Pappus-paleae less than half as long as the disk corolla, more or less awn-tipped; plant puberulent .... 1. *H. puberulum.*
  Pappus-paleae at least two-thirds as long as the disk corollas; plant cinereous-puberulent; lower leaves usually laciniate........... 2. *H. laciniatum.*
Rays equaling or longer than the disk, 10-20 mm. long; heads few on long peduncles; leaves strongly ascending, entire.
  Leaves thin, not at all gummy.................... 3. *H. rivulare.*
  Leaves thick, somewhat gummy.................. 4. *H. Bigelovii.*

1. **H. puberulum** DC. Frequent along streams and in meadows and wet places, especially in the chaparral belt.

2. **H. laciniatum** Gray. Southern California to Sonora.

3. **H. rivulare** Rydb. Stream banks and wet meadows of the Transition Zone, acc. to *Hall,* who treats this as a mere form of the following.

4. **H. Bigelovii** Gray. Oregon to Southern California and western Arizona.

92. BLENNOSPERMA.

Low annual herbs with alternate pinnately parted leaves and peduncle-like branches bearing solitary yellow heads; involucral bracts equal, broadly oblong, united only at the base; receptacle naked; heads many-flowered; ray-flowers fertile; disk-flowers perfect but sterile; achenes obovate, not compressed or angled, densely covered with minute papillae which swell up and form a mucilaginous covering when moistened; pappus none.

1. **B. californicum** T. & G. In moist places; not common in southern California. Wilmington, Los Angeles Co.; Gardena, *McClatchie.* !

VII. TAGETEAE.

- Heads radiate.
  - Flowers yellow.
    - Leaves all opposite; involucral bracts linear; pappus of 12-20 bristles, or sometimes reduced to a crown....................93. Pectis.
    - Leaves alternate, at least above; involucral bracts narrow, with an outer series of calyculate ones; pappus of 10-15 paleae, each of which is dissected into 5-10 bristles..95. Clomenocoma.
  - Flowers purplish; leaves alternate; involucral bracts broadly oblong, acute; pappus double, the inner of 5 lanceolate awn-tipped paleae, the outer of numerous capillary bristles........................94. Nicolletia.
- Heads discoid; flowers white or purple; involucre of about 5 broadly oblong bracts; pappus of capillary bristles only................96. Porophyllum.

93. PECTIS.

Low annuals with erect or prostrate stems, gland-dotted, strong-scented, opposite, narrow, often ciliate leaves and small cymose or solitary heads of yellow flowers; involucre cylindrical or campanulate, of a single series of equal bracts which are inclined to embrace the ray-achenes; style hispidulous, the short branches obtuse and without appendages; receptacle naked; achenes linear, striate; pappus of several or numerous scales, awns or bristles, sometimes reduced to a crown.

1. **P. papposa** Harv. & Gray. Lower Sonoran Zone from the Mohave and Colorado Deserts to Utah and New Mexico. "Chinchweed."

94. NICOLLETIA.

Perennial glabrous and somewhat succulent erect herbs with narrow pinnately parted leaves and rather large heads of purplish flowers; involucre oblong or cylindraceous, either with or without 2 or 3 short outer bracts, its principal bracts 8-12, broadly oblong, acute, dotted with oil-glands and often colored; style appendages long, filiform; achenes attenuate at base, truncate at apex, rusty-pubescent; pappus of two sorts, the outer of numerous capillary bristles, the inner of 5 lanceolate paleae, the costae of which are continued into scabrous awns.

1. **N. occidentalis** Gray. Lower Sonoran Zone of the Mohave and Colorado Deserts. Not common. May-June.

95. CLOMENOCOMA.

Ours strong-scented perennial desert herbs with conspicuously striate stems and rather large terminal heads; herbage either glabrous or minutely pubescent but the involucres blotched with large purple oil-glands; involucre with an inner series of nearly or quite distinct bracts and an outer series of much shorter calyculate ones; achenes cylindrical or angled, striate, glabrous in our species; pappus-paleae about 10, each resolved into numerous capillary divisions. *(Dysodia.)*

Leaves spinulose-dentate; involucre 12-15 mm. high.. 1. *C. Cooperi.*
Leaves 3-5-parted; involucre 10-12 mm. high......... 2. *C. porophylloides.*

1. **C. Cooperi** Rydb. Mohave and Colorado Deserts, east into Arizona, acc. to *Hall.*

2. **C. porophylloides** Rydb. Arizona, southern California and Lower California; Palm Springs, borders of Colorado Desert. May.

96. POROPHYLLUM.

Slender perennial herbs of arid districts; very glabrous but the involucres dotted with oil-glands; leaves narrowly linear, entire; heads solitary, narrow, discoid; involucre of about 5 broadly oblong equal bracts, with no calyculate outer ones; style-appendages subulate; achenes (in our species) attenuate at apex, rusty-pubescent; pappus of numerous capillary bristles.

1. **P. gracile** Benth. Arid plains and hillsides from near the coast of San Diego Co. across the Colorado Desert to Arizona and Texas; on the Mohave Desert at Needles, acc. to *Hall.*

VIII. ANTHEMIDEAE.

Receptacle chaffy.
  Heads solitary; rays 10 to 20.................... 97. Maruta.
  Heads in a terminal cyme; rays 4 to 6............ 98. Achillea.

Heads in open panicles; without rays..............105. Artemissiastrum.
Receptacle naked; heads discoid.
All of the flowers with a corolla.
Heads solitary terminating leafy branches or peduncles; receptacles conical.......... 99. Chamomilla.
Heads in panicled racemes or spikes; receptacle nearly flat.
Pappus present, of a dentate or lacerate crown; receptacle pubescent ....103. Crossostephium.
Pappus wanting.
Corollas and achenes densely arachnoid-villous; spinescent shrubs.................102. Picrothamnus.
Corollas and achenes glabrous, glandular-granuliferous, or the limb of the former rarely somewhat pubescent; plant not spinescent ....104. Artemisia.
Marginal flowers destitute of corolla; receptacle nearly flat.
Heads peduncled; style deciduous................100. Lancisia.
Heads sessile; achenes pointed with the spine-like persistent style ....101. Soliva.

97. MARUTA.

Glabrous or pubescent, branched, ill-scented annual with dissected leaves; heads pedunculate, the receptacle convex, bearing filiform bracts; rays white; achenes 10-ribbed, rugose; pappus none.

1. **M. Cotula** DC. Pastures and waste ground. Naturalized from Europe. Mayweed.

98. ACHILLEA. Yarrow.

Perennial herbs with erect leafy stems, finely dissected, alternate, strong-scented leaves and small heads in corymbs at the ends of the branches; involucres campanulate, of appressed imbricated bracts, the outer ones shorter; achenes oblong or obovoid, slightly compressed; pappus none.

Involucre 5-8 mm. high, 4 mm. or more broad; stem slender, not densely villous; heads not densely crowded; ultimate divisions of the leaves linear, not thickened, spreading; bracts with light brown margins; ligules 3-4 mm. long................... 1. *A. californica.*
Involucre 4-4.5 (rarely 5) mm high, 2.5-4 mm. broad; plant more or less villous.
Ultimate leaf-segments linear, ascending, crowded; rachis merely margined; ligules 2.5-4 mm. long .... 2. *A. lanulosa.*
Ultimate leaf-segments ovate or lanceolate, not callous-thickened towards the apex; ligules white, rarely pink.............. 3. *A. millefolium.*

1. **A. californica** Poll. Southern California, apparently from San Diego northward to San Bernardino and Los Angeles.

2. **A. lanulosa** Nutt. Common in the pine belt of all our mountains; Bear Valley.

3. **A. millefolium** L. Widely distributed. Native of the old world.

99. CHAMOMILLA.

Ours glabrous annuals with alternate leaves pinnately dissected into narrowly linear segments; heads solitary or somewhat cymose, with greenish-yellow flowers; receptacle slender-conical, naked; bracts of the involucre imbricated in few series, the outer a little shorter than the inner, persistent, scarious-margined; corollas tubular and without limb in our species; pappus reduced to a coroniform border or none; achenes glabrous, irregularly nerved. *(Matricaria.)*

Heads 5 to 8 mm. high; achenes with an obscure margin at summit.................... 1. *C. suaveolens.*

Heads mostly 8 to 15 mm. high; achenes with a broad irregularly lobed crown................ 2. *C. occidentalis.*

1. **C. suaveolens** Rydb. Common on low ground. Native of the old world.

2. **C. occidentalis** Rydb. San Jacinto and near San Bernardino; middle California.

100. LANCISIA.

Low herbs with mostly alternate leaves; flowers yellow; heads slender-peduncled, discoid, low-hemispheric; involucral bracts greenish, nearly equal, in 1 or 2 series; receptacle flat or nearly so, naked; outer series of flowers pistillate only; disk-flowers with 4-toothed corolla, perfect, fertile or infertile; mature achenes raised on pedicels, in our species compressed and spongy-margined or narrowly winged; pappus none. *(Cotula.)*

Annual: leaves pinnately dissected; pistillate flowers in 1 or 2 rows....................... 1. *L. australis.*

Perennial: leaves pinnatifid to entire, sheathing at base; pistillate flowers in a single row... 2. *L. coronopifolia.*

1. **L. australis** Rydb. Common in sandy soil about Los Angeles; occurs sparingly as a waif along streets of San Diego and Riverside, acc. to *Hall.*

2. **L. coronopifolia** Rydb. Well established along streams and marshes. Native of Africa.

101. SOLIVA.

Small, depressed herbs with petioled and pinnately dissected leaves and small discoid heads of greenish flowers sessile in the forks; involucre of nearly equal bracts in 1 to 3 series; receptacle naked; outer series of flowers pistillate and apetalous; innermost flowers perfect but sterile, the corolla 4-toothed; achenes obcompressed, pointed with the hardened persistent style, callous-margined or winged, each wing continuing above as a bristle or tooth; pappus none.

1. **S. sessilis** R. & P. Moist ground near the coast in Santa Barbara County, acc. to *Gray*.

102. PICROTHAMNUS.

Low shrub with numerous spreading spiny branches; leaves small, alternate, pedately 5-parted, the divisions 3-lobed; heads globose, racemosely glomerate, on short branches; receptacle naked; involucral bracts 5 or 6, broadly obovate; marginal flowers few, pistillate, fertile; disk flowers hermaphrodite but sterile; achenes and flowers densely arachnoid-hairy. (*Artemisia* in part.)

1. **P. desertorum** Nutt. Mohave Desert north and east to Oregon and Wyoming, acc. to *Hall*. (*Artemisia spinescens* Eat.)

103. CROSSOSTEPHIUM.

Shrubs; leaves alternate, entire or pinnatifid with narrow divisions; heads small, discoid, panicled; involucre hemispheric, its bracts in 2 or 3 series, the inner more or less scarious; receptacle hairy; marginal flowers pistillate and fertile; disk flowers hermaphrodite and fertile; achenes truncate at the apex, 3- to 5-ribbed, with a coroniform, dentate or laciniate pappus. (*Artemisia* in part.)

Leaf-segments less than 1 mm. wide, usually revolute; plant grayish; some of the leaves pinnatifid .... 1. *C. californicum.*
Leaf-segments 1-3 mm. wide, not revolute; lower leaves irregularly pinnatifid .... 2. *C. insulare.*

1. **C. californicum** Rydb. Common in the Upper Sonoran from Lower California to San Francisco Bay.

2. **C. insulare** Rydb. San Clemente and San Nicholas Islands. Type locality, San Clemente Island.

104. ARTEMISIA.

Bitter aromatic herbs or shrubs with alternate, entire to pinnatifid leaves and small rayless heads of inconspicuous, yellow, whitish or brownish flowers in panicles or rarely in simple racemes; disk-flowers perfect and marginal ones pistillate, or all perfect; involucre imbricated, dry and scarious; receptacle nearly flat to hemispheric, naked; achenes obovoid or oblong. with a small terminal areola; pappus none.

Flowers of the margin pistillate; central flowers perfect (their achenes abortive in No. 1).

Herbage glabrous.

Leaves linear, mostly entire.................... 1. *A. dracunculoides.*

Leaves serrulate to bipinnatifid................. 2. *A. biennis.*

Herbage (at least the lower surface of the leaves) tomentose; plant herbaceous (except at base in some) flowers resinous.

Leaves white-tomentose on both sides........... 3. *A. Ludoviciana.*

Leaves green and early glabrate above.......... 4. *A. Douglasiana.*

Flowers all perfect and fertile; shrubs.

Receptacle naked; leaves white-tomentose or canescent on both sides.

Achenes glabrous.

Accessory bracts of the involucre short and ovate; leaves 3-toothed at apex.

Leaves cuneate .... 5. *A. tridentata.*

Leaves linear-cuneate to linear............. 6. *A. angusta.*

Accessory bracts of the involucre oblong or lanceolate; leaves 3-cleft or -parted to entire .... 7. *A. trifida.*

Achenes arachnoid with long hairs; leaves mostly entire .... 8. *A. Parishii.*

1. **A. dracunculoides** Pursh. Common throughout western North America.

2. **A. biennis** Willd. Occasional on low moist ground near Los Angeles; may be looked for elsewhere.

3. **A. Ludoviciana** Nutt. Not common in our region. Bear Valley; Santa Rosa Mts.; Providence Mts.; all acc. to *Hall;* Big Rock Creek.

4. **A. Douglasiana** Besser. Wet ground near the coast, less common in the mountains up to 1,500 meters, from Orange County to Washington and the Rocky Mts.; Verdugo Canyon, El Monte.

5. **A. tridentata** Nutt. Abundant in all the desert region from Lower California to Washington and Montana. Has been found west of the mountains at Descanso, San Diego Co.; Fallbrook, San Diego Co.; Colton and San Bernardino; and between Glendale and Burbank, Los Angeles Co.; all fide *Hall.* Lytle Creek, Wash., *Parish.*

6. **A. angusta** Rydb. Idaho and the Mohave Desert to San Diego, acc. to *Gray.*

7. **A. tripartita** Rydb. Near Lancaster, Mohave Desert, more common in the Sierras and east to Utah.

8. **A. Parishii** Gray. Newhall, Los Angeles Co.; Mohave Desert and Antelope Valley, acc. to *Hall.* Type locality, *Newhall.*

105. ARTEMISIASTRUM.

Herbaceous perennials, more or less grayish-puberulent; leaves alternate, pinnatifid into linear divisions; heads discoid, small, numerous in open panicles, nodding; involucre turbinate, its bracts in 2 series, scarious-membraneous; receptacle convex, with most of the flowers subtended by scarious paleae; flowers all alike perfect and fertile; achenes truncate at the apex, striate and bordered by a small crown.

1. **A. Palmeri** Rydb. San Diego to Lower California. Type locality, Jamuel Valley, 20 miles below San Diego. (*Artemisia Palmeri* Gray.)

IX. SENECIONEAE.

- Involucre of 4-6 bracts; stems woody throughout....106. TETRADYMIA.
- Involucre of more than 6 bracts; stems woody at base or entirely herbaceous.
  - Pappus of plumose bristles.
    - Leaves mostly wanting or reduced to scales......107. BEBBIA.
    - Leaves all basal; alpine perennial...............108. RAILLARDELLA.
  - Pappus of slender bristles (or narrow scales), never plumose.
    - Involucral bracts in 3-4 series, regularly imbricated; leaves mostly scale-like..........109. LEPIDOSPARTUM.
    - Involucral bracts in 1-2 series, not regularly imbricated; leaves conspicuous.
      - Leaves opposite; herbs........................110. ARNICA.
      - Leaves alternate.
        - Pappus bristles nearly equal; bracts of the involucre more than 10, herbaceous, connivent but not overlapping............113. SENECIO.
        - Pappus bristles very unequal.
          - Style tips penicillate; broad-leaved herb...112. PSATHYROTES.
          - Style tips not penicillate; narrow-leaved shrub ....111. PEUCEPHYLLUM.

106. TETRADYMIA.

Low, rigid, canescently tomentose shrubs with alternate narrow entire leaves and cymose-clustered discoid heads of yellow flowers; involucre long and narrow; corollas with long tube, the narrow spreading lobes longer than the campanulate throat; anthers exserted sagittate at base, the tips triangular-lanceolate; achenes terete, faintly 5-nerved; pappus of fine and soft scabrous capillary white or whitish bristles.

Pappus copious, much exceeding the hairs of the achene, or the achene glabrous.
  Heads 4-flowered; leaves not spiny.
    Leaves linear to oblanceolate, 1-2 cm. long, not glabrate .... 1. *T. canescens.*
    Leaves linear to subulate, less than 1 cm. long, glabrate .... 2. *T. glabrata.*
  Heads 5-flowered; upper leaves rigid, spiny....... 3. *T. stenolepis.*
Pappus-bristles in a single series, scarcely exceeding the long ascending hairs of the achene.
  Heads pedunculate, scattered or loosely racemose.. 4. *T. spinosa.*
  Heads nearly sessile in a close terminal cyme...... 5. *T. comosa.*

1. **T. canescens** DC. Upper Sonoran and Transition Zones below 2,300 m. alt. Rocky Creek; Barton Flat; Bear Valley; to the Sierra Nevada and Rocky Mts.

2. **T. glabrata** Gray. Lower and Upper Sonoran Zones from the Mohave Desert to Oregon and Utah. Lancaster; Owens Valley; Rabbit Springs, *Parish.*

3. **T. stenolepis** Greene. Lower Sonoran Zone of the desert area from Antelope Valley to Inyo Co.

4. **T. spinosa** H. & A. A common species of the desert area.

5. **T. comosa** Gray. Occasional in the Sonoran Zones west of the mountains from Los Angeles Co. to San Diego Co.

107. BEBBIA.

Shrubby at base with slender, rush-like erect branches and few alternate linear leaves; heads pedunculate, 20-30-flowered; involucre campanulate, the bracts imbricated in 2 or 3 series, oblong, appressed; achenes turbinate, hirsute, faintly 5-nerved; pappus of 15-20 plumose bristles in a single series.

1. **B. juncea** Greene. Western San Bernardino Co. to Lower California, in the Lower Sonoran Zone.

Var. *aspera* Greene. Herbage scabrous with upturned white hairs, or these deciduous from the stems leaving only the pustule-like bases. Occasional on the Mohave Desert; common on the Colorado Desert, east to Nevada and Arizona.

108. RAILARDELLA.

Low scapose perennial of the Alpine Zone, with entire silvery-tomentose leaves and solitary heads; involucral bracts barely over-lapping; receptacle flat; heads discoid in our species; corollas with short tube, elongated throat, and 5 short naked teeth; style-appendages flattish, with lanceolate or cuspidate tips; achenes linear, pubescent; pappus of 12-25 slender soft plumose bristles.

1. **R. argentea** Gray. Known in Southern California only from the summit of Mt. San Gorgonio.

109. LEPIDOSPARTUM.

A low rigid broom-like almost leafless shrub with corymbose or racemose heads of pale yellow flowers; involucral bracts regularly imbricated in 3 or 4 series, chartaceous, oblong, obtuse; receptacle naked; heads discoid; corolla with long tube, short campanulate throat and spreading lobes; style-branches flattish with acute tips; achenes terete, faintly 8- to 10-nerved; pappus of numerous soft white, minutely scabrous, capillary bristles.

1. **L. squamatum** Gray. Frequent in dry washes in all the interior valleys.

110. ARNICA.

Erect simple-stemmed perennials with opposite leaves, or the upper alternate, and long-pedunculate heads of yellow flowers; rays yellow, showy; involucre campanulate, the narrow bracts in 1 or 2 series, nearly equal; receptacle flat; achenes slender, somewhat 5- to 10-costate or -angled; pappus a single series of slender barbellate white bristles.

Stems from creeping rootstocks; leaves cordate-ovate, obtuse, the cauline petiolate...... 1. *A. cordifolia.*

Stems from a cluster of thick roots; leaves elliptic-lanceolate, acute .... 2. *A. bernardina.*

1. **A. cordifolia** Hook. Lower Transition Zone on Cuyamaca Mt., San Diego Co., *Dunn;* in the Sierras to British Columbia and in the Rocky Mts. of Colorado.

2. **A. bernardina** Greene. Meadows of the Upper Transition and Canadian Zones, at 2,000 to 2,750 m. alt., San Bernardino Mts.; type locality, Bear Valley.

111. PEUCEPHYLLUM.

Desert shrub with crowded terete resinous-punctate leaves and scattered heads of yellowish discoid flowers; involucre campanulate, foliaceous; receptacle flat, naked; corollas with short tube, long cylindric throat, and ovate, erect, obtuse, puberulent teeth; achenes turbinate-oblong, very hirsute; pappus of numerous unequal roughish bristles shorter than the corolla, and sometimes somewhat flattened and paleaceous.

1. **P. Schottii.** Gray. Canyons and foothills of the Lower Sonoran Zone, from Inyo Co. to Lower California and Arizona. Palm Springs.

112. PSATHYROTES.

Low winter annuals with alternate, broad and rounded, petiolate leaves and small discoid heads of yellowish or purplish flowers; involucre broadly hemispheric, the rather numerous bracts in 2 series, the outer somewhat herbaceous; receptacle flat, naked; corolla with very short proper tube, elongated cylindric throat, and short, more or less woolly or glandular teeth; achenes turbinate, obscurely striate, villous or hirsute; pappus of numerous short scabrous unequal bristles.

Outer involucral bracts much broader than the inner, the obtuse tips spreading or recurved; leaves thick; corollas yellowish or purplish .... 1. *P. ramosissima.*
Outer bracts not very different from the inner, the tips all erect; leaves thinner; corollas pale yellow or purplish................ 2. *P. annua.*

1. **P. ramosissima** Gray. Very common on ledges of rocks and in stony soil on the Colorado Desert of eastern Riverside and Imperial Counties.

2. **P. annua** Gray. Lower Sonoran Zone from the Mohave Desert east to Utah and Arizona.

113. SENECIO.

Herbs or woody plants with alternate, sessile or petiolate, entire to pinnatifid or subpinnate leaves and solitary, racemose, or corymbose heads of yellow flowers; heads radiate or discoid, many-flowered; involucre cylindric to campanulate, of few to many erect connivent bracts, sometimes with a few smaller ones at the base; receptacle flat, naked; achenes terete; pappus abundant of white, soft, capillary bristles.

Annual.
  Rays conspicuous; herbage glabrous or pubescent; leaves thin .... 1. *S. californicus.*
  Rays inconspicuous or wanting.
    Leaves coarsely dentate, auriculate-clasping by a broad base; indigenous desert annual.... 2. *S. mohavensis.*
    Leaves pinnatifid, not greatly expanded at base.
      Bracts of involucre black-tipped; heads discoid. 3. *S. vulgaris.*
      Bracts of involucre not black-tipped; rays present, minute; plants slightly pubescent 4. *S. aphanactis.*
Perennial.
  Stems herbaceous; lower leaves undivided or with broad, rounded lobes.
    Leaves entire to serrate or pinnatifid.
      Heads discoid; leaves elliptic or oblanceolate, remotely dentate .... 5. *S. astephanus.*

Heads radiate.
  Plant leafy up to the inflorescence, leaves acute.
    Leaf-blade triangular-lanceolate, 2-5 cm. wide .... 6. *S. triangularis.*
    Leaf-blade linear, 1-3 mm. wide; var. sanctus of .... 7. *S. serra.*
  Plant nearly leafless above the middle.
    Herbage at first tomentose, later glabrate; leaves more or less uniform throughout and mostly pinnately divided........ 8. *S. inophyllus.*
    Herbage permanently tomentose or more or less glabrate; stem leaves upwardly reduced .... 9. *S. bernardinus.*
Leaves mostly pinnately divided or parted and again lobed or incised........10. *S. Breweri.*
Stems suffrutescent at base; leaves (except the upper) pinnately parted into linear lobes.
  Leaf-lobes acute; involucral bracts many........11. *S. Douglasii.*
  Leaf-lobes obtuse; involucral bracts fewer; insular species ....12. *S. Lyoni.*

1. **S. californicus** DC. Common in sandy soil of the chaparral zone and on the sand dunes along the coast from Lower California to Santa Barbara.

2. **S. mohavensis** Gray. Lower Sonoran Zone of the Mohave and Colorado Deserts.

3. **S. vulgaris** L. Occasional in waste places, flowering throughout the year. Native of Europe.

4. **S. aphanactis** Greene. Seldom noticed, probably being passed over for *S. vulgaris;* Lower California; San Diego; Saugus, *Davy.*

5. **S. astephanus** Greene. Upper Sonoran Zone, on the trail to Mt. Wilson, San Gabriel Mts.

6. **S. triangularis** Hook. Along streams and in bogs of the mountains at 2,200 to 2,800 m. alt. Bluff Lake, San Bernardino Mts.; South Fork of the Santa Ana River; Mt. San Antonio, *Johnston.*

7. **S. serra sanctus** Hall. South Fork of the Santa Ana River, at 2,600 m. alt., *Hall.*

8. **S. ionophyllus** Greene. Upper Sonoran and Transition Zones. Rock Creek, San Gabriel Mts.; Swarthout Canyon, San Antonio Mts., *Hall;* Bear Creek, San Bernardino Mts., *Parish.*

Var. *intrepidus* Greenm. is a low form with mostly basal, small, dentate to pinnatifid leaves and few heads. Lytle Creek Canyon, *Hall;* South Fork of the Santa Ana River, *Mrs. Wilder.*

9. **S. bernardinus** Greene. San Bernardino Mts. Bear Valley, type station.

Var. *sparsilobatus* Greenm. is white floccose-tomentose throughout; stem leaves pinnately lobed with remote entire or dentate lobes. Trail from Barton Flats to South Fork of the Santa Ana River, *Mrs. H. E. Wilder.* Type locality.

10. **S. Breweri** Davy. Upper Sonoran Zone on moist, grassy slopes; Tejon Pass, *Parish;* Fort Tejon, *Hall;* Tehachepi Pass.

11. **S. Douglasii** DC. Common on dry plains and foothills in the Upper Sonoran Zone.

12. **S. Lyoni** Gray. San Clemente Island, *Nevin & Lyon;* Santa Catalina Island, *Brandegee.*

X. CYNAREAE.

Achenes obliquely inserted on the receptacle.........114. CENTAUREA.
Achenes not obliquely inserted on the receptacle.
 Filaments distinct.
  Pappus rough but not plumose; involucral bracts slender-subulate with hooked tips.......115. ARCTIUM.
  Pappus plumose; involucral bracts not slender-subulate, tips not hooked.
   Receptacle dry; native species................116. CIRSIUM.
   Receptacle fleshy-thickened; garden escapes....117. CYNARA.
 Filaments united below into a tube..............118. SILYBUM.

114. CENTAUREA. STAR THISTLE.

Erect or diffuse usually rigid herbs with alternate entire dentate or pinnatifid leaves and large or medium-sized heads; involucre ovoid or globose, its bracts imbricate and tipped with a stout spine or a fringed or toothed (rarely entire) appendage; receptacle flat, bristly; flowers tubular, the marginal much larger and neutral or the heads homogamous; achenes somewhat compressed, mostly smooth, obliquely or laterally inserted on the receptacle; pappus of slender scabrous bristles or scales or rarely none.

Flowers yellow; involucral bracts spinose.
 Plant erect, branching mostly above the base; spines .5 to 1 cm. long........................ 1. *C. melitensis.*
 Plant diffuse, branching from the base; spines 1 to 2 cm. long............................ 2. *C. solstitialis.*
Flowers blue, white or purple; involucral bracts fimbriate .... 3. *C. cyanus.*

1. **C. melitensis** L. A common weed in fields and along waysides. Native of southern Europe.

2. **C. solstitialis** L. Introduced at San Diego, acc. to *Gray.* Native of Europe.

3. **C. cyanus** L. An occasional escape from cultivation. Native of Europe.

115. ARCTIUM. Burdock.

Coarse biennial herbs with large, roundish, petiolate leaves and hemispheric, medium-sized heads of pink or purplish flowers; involucres globose, the many-ranked imbricated bracts with hooked tips forming a bur; receptacle bristly; achenes oblong, pappus of numerous short bristles.

1. **A. lappa** L. Becoming established near Riverside, *Reed.*

116. CIRSIUM. Thistle.

Coarse biennial or perennial herbs with spiny, lobed or pinnatifid, sessile, alternate or basal leaves and large many-flowered solitary or clustered heads; flowers all tubular, perfect or rarely dioecious; bracts of the involucre imbricated in many series, mostly tipped with spines; receptacle bristly or hairy; achenes oblong or ovoid, compressed, smooth; pappus of numerous plumose bristles connate at base, deciduous. *(Carduus. Cnicus.)*

Leaves only moderately if at all decurrent.
Heads sessile or short pedunculate, leafy-bracted at base.
Bracts of the involucre entire, the innermost often scarious tipped.
Corolla-lobes with callous capitate tips; bracts narrow not appressed-imbricate........ 1. *C. edule.*
Corolla-lobes acute; bracts appressed-imbricate, the short outer ones ovate............ 2. *C. Drummondii.*
Bracts of the involucre finely spinescent on the margins above the middle.............. 3. *C. maritimum.*
Heads solitary on long peduncles, not leafy-bracted at base.
Corolla-lobes longer than the throat, red or crimson.
Corolla-lobes but little exceeding the throat; leaves glabrate above, canescent beneath; involucral bracts linear-subulate, ascending, tipped with a straight spine; pappus short, rather scanty.................... 4. *C. occidentale.*
Corolla lobes longer than the throat.
Herbage loosely lanate; involucral bracts lanceolate-subulate, short-spinescent, glabrate; pappus-bristles barbellate above the plumose part..................... 5. *C. Coulteri.*
Herbage densely white arachnoid-tomentose throughout; involucral bracts with appressed base and squarrose-spreading or recurved tips; pappus long, plumose throughout .... 6. *C. candidissimum.*

Corolla-lobes equalling or shorter than the throat, white or pinkish.

Outer involucral bracts with coriaceous base and lanceolate-spreading incurved upper part, slender spined; the inner straight with herbaceous tips; corolla-lobes shorter than the throat.................... 7. *C. californicum.*

Involucral bracts ovate-acuminate, closely appressed, weakly spinescent, ciliolate margined; corolla-lobes about equalling the throat .... 8. *C. bernardinum.*

Leaves strongly decurrent, the middle cauline ones for a third their length; a desert species. 9. *C. mohavense.*

1. **C. edule** Nutt. Reported from Pasadena and San Bernardino. 1884.

2. **C. Drummondii** T. & G. Julian, San Diego Co.; Yucaipa, near Redlands; Mt. Pinos, *Hall.* North to the Arctic regions.

Var. *acaulescens* (Gray). Heads smaller, sessile in the center of a rosette of radical leaves. With the species in meadows of the Transition Zone.

3. **C. maritimum** (Elmer). Near the coast of Santa Barbara Co., at Surf.

4. **C. occidentale** Jepson. San Diego Co. to Oregon; most common toward the coast

5. **C. Coulteri** Harv. & Gray. Zaca Mt., Santa Barbara Co.; eastern base of Mt. Pinos, Ventura Co.; inner Coast Ranges and Sierra Nevada Mts.

6. **C. candidissimum** (Greene). Near the coast at Santa Barbara.

7. **C. californicum** Gray. Occasional in dry, sandy soil from Lower California, northward.

8. **C. bernardinum** (Greene). Dry hillsides of Little Bear Valley, San Bernardino Co., the type station; southward to San Diego Co., where it is the prevailing thistle in the coastal area.

9. **C. mohavense** (Greene). In alkaline meadows about springs in the Mohave desert.

117. CYNARA.

Robust perennial herbs with pinnatifid sessile leaves, their lobes spinescently tipped, and very large solitary globose heads; involucral bracts well imbricated, coriaceous, spinescent (or spineless in cultivated varieties); receptacle fleshy, fimbrillate; corolla tubular with narrow segments; achenes obovate, compressed, 4-angled, smooth; pappus of several series of plumose bristles.

Leaves and involucral bracts unarmed............ 1. *C. scolymus.*
Leaves and involucral bracts spinescent............ 2. *C. cardunculus.*

1. **C. scolymus** L. Occasional as a garden escape. *Artichoke.*

2. **C. cardunculus** L. A garden escape at San Bernardino and at Trujillo's Ranch, San Diego Co., acc. to *Parish. Cardoon.*

118. SILYBUM.

Annual or biennial herbs with ample prickly clasping leaves which are very conspicuously blotched with white along the veins; heads very large, solitary at the ends of the branches; involucral bracts broad appressed-tipped with an abruptly spreading, broadly lanceolate and ciliate-prickly spine; corolla with filiform tube conspicuously dilated below the narrow lobes; pappus bristles in several series, barbellate.

1. **S. marianum** Gaertn. A wayside weed, introduced from Europe. *Milk Thistle.*

ADDENDA

Introduced Plants Omitted in the General Text

Potamogeton crispus L. Santa Ana River near Corona, *Johnston,* 1918.

Paspalum Larranagae Asch. Palm Springs, 1913.

Digitaria humifusa Pers. Pasadena, 1906.

Panicum miliaceum L. Broom-corn Millet. An occasional waif, Riverside, 1910.

Echinochloa zelayensis Schult. Common in the Colorado Delta; Yuma, 1912.

Pennisetum villosum R. Br. Occasional escape, Santa Barbara, 1908.

Oryzopsis miliacea B. & H. Smilo Grass. Now fairly well established on certain roadsides; Los Angeles, 1896.

Aira carophylea L. Hair Grass. A waif at San Bernardino, 1894.

Bromus tectorum nudus K. & R. Ontario; Santa Barbara, 1910.

Do. scoparius L. Santa Barbara.

Do. sterilis L. Matilija, Ventura Co., 1897.

Eichornia crassipes Solms. Water Hyacinth. San Gabriel and Los Angeles Rivers, 1894.

Asparagus officinalis L. Asparagus. Occasional escape.

Asphodelus fistulosus L. A waif near Redlands, 1909.

Fagopyrum esculentum Moench. Buckwheat. Roadside casual La Verne, 1918.

Cycloloma atriplicifolium Coult. Winged Pigweed. Rapidly becoming naturalized in San Bernardino Co., near Colton, 1909.

Atriplex Lindleyi Moq. Adventive in San Diego Co., 1916. Venice 1921.

Tetragona expansa Murr. Abundant on the beach at Santa Barbara, 1916.

Mesembryanthemum coccineum Haw. Well established along the coast near the Torrey pines; Del Mar, 1918.

Mesembryanthemum edule L. An occasional escape along Los Angeles' beaches; Playa del Rey, 1918.

Arenaria serpyllifolia L. Lawns at Claremont, 1918.

Agrostemma githago L. Corn Cockle. An infrequent waif in grain fields; San Bernardino, 1912.

Lychnis alba Mill. White Campion. Lawns at Claremont, 1916.

Spergularia rubra Presl. Claremont, 1916.

Brassica napus L. Rape. A waif at Highland, 1917.

Diplotaxis muralis DC. In one locality at San Bernardino, 1914.

Sisymbrium Irio L. Orchards at Upland, 1918.

Matthiola incana R. Br. Garden Stock. Well established near Del Mar; Laguna Beach, 1916.

Fumaria officinalis L. Fumitory. Well established in some orchards at Ontario and Upland, 1917.

Reseda lutea L. Yellow Mignonette. An occasional escape; Los Angeles, 1904.

Erodium cygnorum Nees. Near San Diego, 1916.

Geranium Pyreniacum L. A casual on Vivian Creek trail, San Gorgonio Mt., 1905.

Ailanthus glandulosa Desf. An occasional escape.

Abutilon Theophrasti Medic. A waif at Riverside, 1917.

Hibiscus Trionum L. A waif at Riverside, 1917.

Tamarix Pallisii Desv. A single shrub in the Salton Sink, 1916.

Gaura sinuata L. Camarillo, Ventura, 1916.

Araujia sericifera Bert. Riverside, 1914.

Lycopsis arvensis L. Locally established at Upland, 1917.

Lamium amplexicaule L. Well established at Claremont, 1918; Los Angeles, 1920.

Lycium halmifolium Mill. Matrimony Vine. A garden escape; San Bernardino, 1910.

Plantago coronopus L. Along the beach at Catalina, 1895.

Lonicera japonica Thunb. Japanese Honeysuckle. Becoming naturalized at San Bernardino, 1910.

Dipsacus Fullonum L. Well established in San Diego in 1870.

Scabiosa atropurpurea L. Occasional along streets; San Bernardino, 1890.

Sonchus arvensis L. Perennial Sow-thistle. Believed to have been introduced in Celery seed, in the peat lands about Wintersberg and Smeltzer, Orange Co. Already well established in 1913.

Centaurea eriophora L. Los Angeles, 1911. The only record for the State.

Centaurea repens L. In a field of sugar beets at Artesia, Los Angeles Co., 1919. Becoming rapidly established and difficult to eradicate. Not elsewhere reported from the United States.

Cnicus benedictus L. Blessed Thistle. Casual in Los Angeles, 1918.

Cirsium arvense L. Canada Thistle. Peat lands about Wintersberg, Orange Co., 1917.

Chrysanthemum coronarium L. Naturalized along railroad tracks, San Diego, 1919.

Xanthium italicum Mor. Los Angeles, *Hasse*, the only California collection.

Xanthium strumarium L. Overflowed bottom lands of the Colorado River, 1913.

Bellis perennis L. English daisy. An occasional escape, Los Angeles, 1892.

A GLOSSARY OF THE TERMS USED IN THE MANUAL

Acaulescent. Stemless or apparently so.

Accumbent. Having an edge against or towards the radicle.

Achene. A dry, hard indehiscent 1-celled and 1-seeded seed-like fruit.

Acuminate. Tapering to a point.

Acute. Sharp at the end.

Adnate. United.

Adpressed. Pressed close to anything.

Aestival. Produced in summer.

Albumen. Nutritive material in the seed external to the embryo.

Amplexicaul. Clasping the stem with their base.

Annular. Forming a ring.

Anterior. The part of a flower next the bract or in front.

Anther. The part of the stamen which contains the pollen.

Apex. The end furthest from the point of attachment.

Apical. At or relating to the apex.

Apiculate. Abruptly terminated by a short point.

Arcuate. Arched, bent like a bow.

Areola. The spaces in any reticulated surface.

Aril. An expanded appendage to the seed stalk, surrounding the seed.

Asperous. Rough with raised points.

Attenuate. Narrowing gradually to a point.

Auricle. The ear-like lobe at the base of the leaf.

Awn. A bristle-like appendage as the beard of barley.

Axil. The upper angle formed by the union of the stem and leaf.

Axillary. Placed in an axil.

Axis. The line passing through the center of anything.

Baccate. Pulpy like a berry.

Banner. The upper petal in a papilionaceous, or pea flower.

Berry. A pulpy fruit formed from a single ovary.

Bifid. Divided halfway down into two parts.

Bipinnate. Twice pinnate.

Blade. The expanded portion of a leaf.

Bract. A leaf or modification of a leaf subtending a flower or flower cluster.

Bracteate. Having bracts.

Bractlet. A secondary bract upon the pedicel of a flower.

Bulb. A leaf-bud with fleshy scales, usually placed underground.

Caducous. Falling early, not at all persistent.

Caespitose. Growing in tufts from the roots.

Calyx. The outer envelope of a flower.

Canescent. Hoary with a greyish pubescence.

Capillary. Like a hair.

Capitate. Growing in heads or close clusters.

Capsule. A dry usually many-seeded seed-vessel.

Carpel. The divisions of the ovary.

Catkin. A scaly unisexual spike.

Cauline. Growing from the stem, not radical.

Cilia. Hairs placed like eyelashes on the edge of anything.

Circinate. Rolled from the tip into a spiral.

Circumscissile. Dehiscing by a transverse line of division.

Clavate. Clubshaped.

Claw. The narrow base of a petal.

Coma. A tuft of hairs.

Commissure. The inner faces of the carpels of Apiaceae.

Complicate. Folded together.

Conduplicate. Folded upon each other lengthwise.

Connate. United in one, growing together.

Connective. The portion of a stamen connecting the two cells of an anther.

Convolute. Rolled together lengthwise.

Coriaceous. Leathery.

Corm. A solid fleshy bulb, not scaly.

Corneous. Like horn.

Corymb. Pedicels of unequal length forming a flat topped inflorescence.

Costate. Ribbed.

Crenate. With rounded marginal teeth.

Cuneate. Like a wedge.

Cuspidate. Tipped with a short point.

Cyme. A broad and flattish inflorescence flowering from the center outward.

Deciduous. Falling off.

Decumbent. Lying on the ground, but tending to rise at the end.

Decurrent. Where the edges of the leaf runs down the stem below its insertion.

Decussate. Opposite leaves, but the successive pairs placed at right angles to each other.

Dehiscence. The mode in which an organ opens.

Deltoid. Having the shape of the Greek letter delta.

Dentate. Toothed with the teeth standing directly outward.

Denticulate. Finely dentate.

Didymous. In pairs, twin.

Digitate. Fingered, divided like the fingers of the hand.

Dioecious. With the sexes on different plants.

Distichous. In two ranks or rows.

Divaricate. Widely diverging.

Dorsal. Attached to, or on the back.

Drupe. A stone-fruit.

Ebractate. Without bracts.

Echinate. Beset with prickles.

Emarginate. Slightly notched at the end.

Emersed. Raised above the water.

Equitant. Astride, conduplicate leaves which fold over each other in two ranks.

Erose. Gnawed on the edge.

Excurrent. Extending beyond the edge or point.

Explanate. Opened out flat.

Exstipulate. Without stipules.

Extrorse. Directed outward.

Falcate. Sickle-shaped.

Farinose. Covered with a white mealy powder.

Fascicle. A close bundle or cluster.

Favose. Pitted or honey-combed.

Filament. The stalk supporting the anther.

Filiform. Thread-like.

Fimbriate. Fringed.

Fistulous. Hollow.

Flabellate. Fan-shaped.

Floccose. With little tufts like wool.

Follicle. A pod formed from a single pistil dehiscing along the ventral suture only.

Fruticose. Shrubby.

Fugacious. Soon falling off.

Fulvous. Tawny.

Fusiform. Spindle-shaped.

Galea. A helmet, the helmet-like upper lip of the Mint and Figwort families.

Geniculate. Bent abruptly, like a knee.

Gibbous. Swollen on one side.

Glabrous. Without hairs or other clothing.

Glabrate. Becoming glabrous.

Glandular. Bearing glands or gland-like.

Glaucescent. Somewhat glaucous or becoming so.

Glaucous. Covered with a fine whitish bloom.

Glochidiate. Barbed like a fish hook.

Glomerate. Closely clustered.

Glume. In grasses the chaff-like bracts subtending the spikelet.

Gynobase. A short thick prolongation of the axis upon which the pistil rests.

Halophyte. A plant growing in saline or alkaline soils.

Hastate. Triangular or arrow-shaped with the basal lobes directed outward.

Hermaphrodite. Having both sexes in one flower.

Hilum. The mark on a seed which indicates its place of attachment.

Hirsute. Pubescent with rather coarse or stiff hairs.

Hispid. With stiff or rigid hairs.

Hispidulous. Minutely hispid.

Hoary. With greyish-white down.

Hyaline. Transparent.

Hypogynous. Growing from the base of the ovary and free from the perianth.

Imbricate. Overlapping like the tiles on a roof.

Immersed. Growing wholly under water.

Incised. Irregularly, sharply and deeply cut.

Included. Not extending beyond the organs surrounding it.

Indehiscent. Not bursting.

Indusium. In ferns, the scale-like covering of the fruit-cluster.

Internode. The part of a stem between two nodes.

Introrse. Turned inward.

Involucels. The involucres of secondary umbels.

Involucre. A circle of bracts subtending a flower cluster.

Lacerate. Torn; irregularly and deeply cleft.

Laciniate. Divided into narrow irregular lobes.

Lanceolate. Narrowly elliptic and tapering to each end.

Lamella. A thin plate or scale.

Lanate. Densely woolly.

Legume. A capsule formed from a single carpel and dehiscing by two valves.

Lenticular. Like a double convex lens.

Ligneous. Woody.

Ligule. The strap-shaped part of the ray flower in Compositae; the membrane at the base of the limb of the leaf in grasses.

Linear. Narrow and elongated with parallel sides.

Loculicidal. Opening down the back (or midrib) of the carpel.

Lyrate. Pinnatifid with the terminal lobe largest and rounded, the others successively smaller.

Marcescent. Withering but remaining in its place.

Monadelphous. Stamens united into one column.

Moniliform. Beaded, constricted at regular intervals.

Monoecious. With stamens and pistils in separate flowers on the same plant.

Mucronate. Abruptly tipped with a short point of the same texture.

Multicipital. With many stems from one crown root.

Muricate. Rough with short hard points.

Nectary. An organ that secretes honey.

Obcompressed. Flattened contrary to the direction of the sides, dorsally instead of laterally.

Obcordate. Inverted heart-shaped.

Oblanceolate. Inverted lanceolate.

Ocrea. A tubular stipule sheathing the stem.

Ochroleucous. Yellowish-white.

Palate. A protrusion of the lip of a bilabiate corolla.

Palea. A chaff or chaffy bract; in grasses the two inner bracts of the flower.

Palmate. With lobes spreading like the fingers of a hand from the same point.

Panicle. A loose, irregularly branched inflorescence.

Papillae. Small elongated protuberances.

Pappus. In Compositae, the hairs, bristles or scales crowning the akene and taking the place of a calyx.

Parietal. Related to or situate on the walls of a cavity.

Patent. Spreading widely.

Pectinate. Cleft like the teeth of a comb.

Pedate. Palmately divided with the lateral divisions again 2-cleft.

Pedicel. The branch of a peduncle.

Peduncle. Flower stalk.

Peltate. Shield-shaped; the petiole attached to the under side, not at the edge.

Perfect. Flowers have both fertile stamens and pistils.

Perfoliate. When the leaf completely surrounds the stem so that the latter seems to pass through it.

Perianth. The floral envelopes, the calyx and corolla so far as present.

Perigynous. Inserted on the calyx.

Petals. The divisions of the corolla.

Petiolate. Having a petiole.

Petiole. The stalk of a leaf.

Pilose. With long soft hairs.

Pinnae. The segments of a pinnate leaf.

Pinnate. When leaflets are arranged on opposite sides of a common stalk.

Pinnatifid. A leaf deeply cut into segments nearly to the midrib.

Pistil. The ovary, style and stigma taken together.

Placenta. The part of the carpel from which the ovule springs.

Plicate. Plaited.

Puberulent. Very minutely pubescent.

Pubescent. Clothed with hairs, usually short and soft.

Pulverulent. Covered with fine powdery matter.

Punctate. Having minute spots like pin-holes.

Pungent. Terminating in a rigid and stout sharp point.

Pustular. Having low elevations like a small blister.

Pyriform. Pear-shaped.

Raceme. A flower cluster in which the flowers are borne on peduncles of nearly equal length: hence.

Racemose. Flowering in a raceme.

Rachis. The central stem of some kinds of inflorescence.

Radical. Springing from the root or just above it.

Ray. One of the radiating branches on an umbel; the marginal flowers as distinct from the disk, of a compound flower.

Receptacle. The dilated top of the stalk bearing the flowers in Composites; the common support of the parts of a flower.

Reniform. Kidney-shaped.

Repand. With rather a wavy margin.

Reticulate. Forming a network.

Retrorse. Turned back or downward.

Retuse. Abruptly blunt with a notch in the middle.

Revolute. Rolled backward from each side.

Rhizome or *rootstock.* An underground stem producing roots and leafy shoots.

Rufous. Reddish or brownish red.

Rugose. Wrinkled; *rugulose*, finely wrinkled.

Runcinate. Where the lobes of leaves are directed towards the base.

Saccate. Sac-shaped.

Sagittate. Shaped like an arrowhead.

Samara. An indehiscent membranously winged fruit as in the Maple.

Scabrous. Rough with minute rigid points.

Scape. A leafless radical flower-bearing stem.

Scarious. Very thin, dry and semi-transparent.

Scorpoid. Said of a flower branch circinately coiled and the flowers produced only on the upper side.

Scrobiculate. Marked by minute depressions.

Secund. All turned to one side.

Sepals. The divisions of the calyx.

Septicidal. A capsule splitting between the partitions of the cells.

Septum. A partition dividing a cavity.

Serrate. Toothed like a saw.

Sessile. Without a stalk.

Seta. A bristle.

Setose. Bearing bristles.

Silicle. A short silique, not much longer than wide.

Silique. A long pod-like fruit of Crucifers having its edges connected by an internal membrance.

Sinuate. With a strongly wavy margin.

Sordid. Of a dull white or dirty hue.

Spadix. A succulent spike bearing many sessile closely placed flowers.

Spathe. A bract enclosing a flower cluster.

Spatulate. Narrowed downward from a rounded summit.

Spike. A long simple axis with many simple flowers.

Spikelet. A secondary spike; the flower cluster of grasses.

Spine. A sharp, stiff, woody thorn.

Spinose. Furnished with or resembling spines; *spinulose,* the diminutive.

Squarrose. Covered with appendages spreading at right angles or more.

Stamen. The male organ of a flower, usually formed of a filament and anther.

Staminate. Bearing stamens only.

Staminodium. A sterile stamen or something taking the place of a stamen.

Stellate. Radiating from the center like a star.

Stigma. The part of the style to which the pollen adheres.

Stipe. Stalk by which the ovary is raised above the receptacle.

Stipitate. Having a stipe.

Stipules. Leaflike appendages at the base of the petiole.

Stolon. A horizontal offshoot from the base of a plant.

Stoma, pl. *stomata.* Minute pores in the skin of plants.

Striate. Streaked with fine furrows.

Style. The space between the ovary and the stigma.

Strigose. With straight appressed hairs or bristles.

Strophiole. An appendage near the hilum of seeds.

Stylopodium. The enlargement crowning the ovary and supporting the style in Apiaceae.

Subulate. Awl-shaped.

Suffrutescent. Woody at base; somewhat or slightly shrubby.

Sulcate. Grooved or furrowed.

Suture. A line of union or dehiscence.

Sympetalous. Petals more or less united into one piece.

Syncarpous. Fruit formed of cohering carpels.

Terete. Having a nearly round transverse section.

Ternate. In threes; with three divisions.

Thyrsoid. Having a contracted or close ovate panicle.

Tomentose. Pubescent with matted wool.

Torulose. Cylindrical with constrictions at intervals.

Trichotomous. In forks of three prongs.

Trifid. Three-cleft.

Triquetrous. Three sided.

Truncate. Blunt as if cut off at the end.

Tuberculate. Covered with little knobs.

Tunicate. Having concentric coats, as an onion.

Turbinate. Top-shaped.

Umbel. An inflorescence with the pedicels radiating from the same point; umbrella shaped.

Umbilicate. Pitted in the centre; navel-like.

Uncinate. Hooked at the extremity.

Undulate. Wavy.

Unguiculate. Of a petal, narrowed below into a claw.

Urceolate. Like a pitcher or urn contracted at the mouth.

Utricle. A small bladdery usually 1-seeded carpel.

Ventricose. Swelling unequally on one side.

Vernation. The arrangement of leaves in a bud.

Verrucose. Covered with wart-like elevations.

Versatile. Swinging freely on its support.

Villose. Shaggy with long soft hairs.

Virgate. Slender like a wand or rod.

Viscous. Glutinous, sticky.

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